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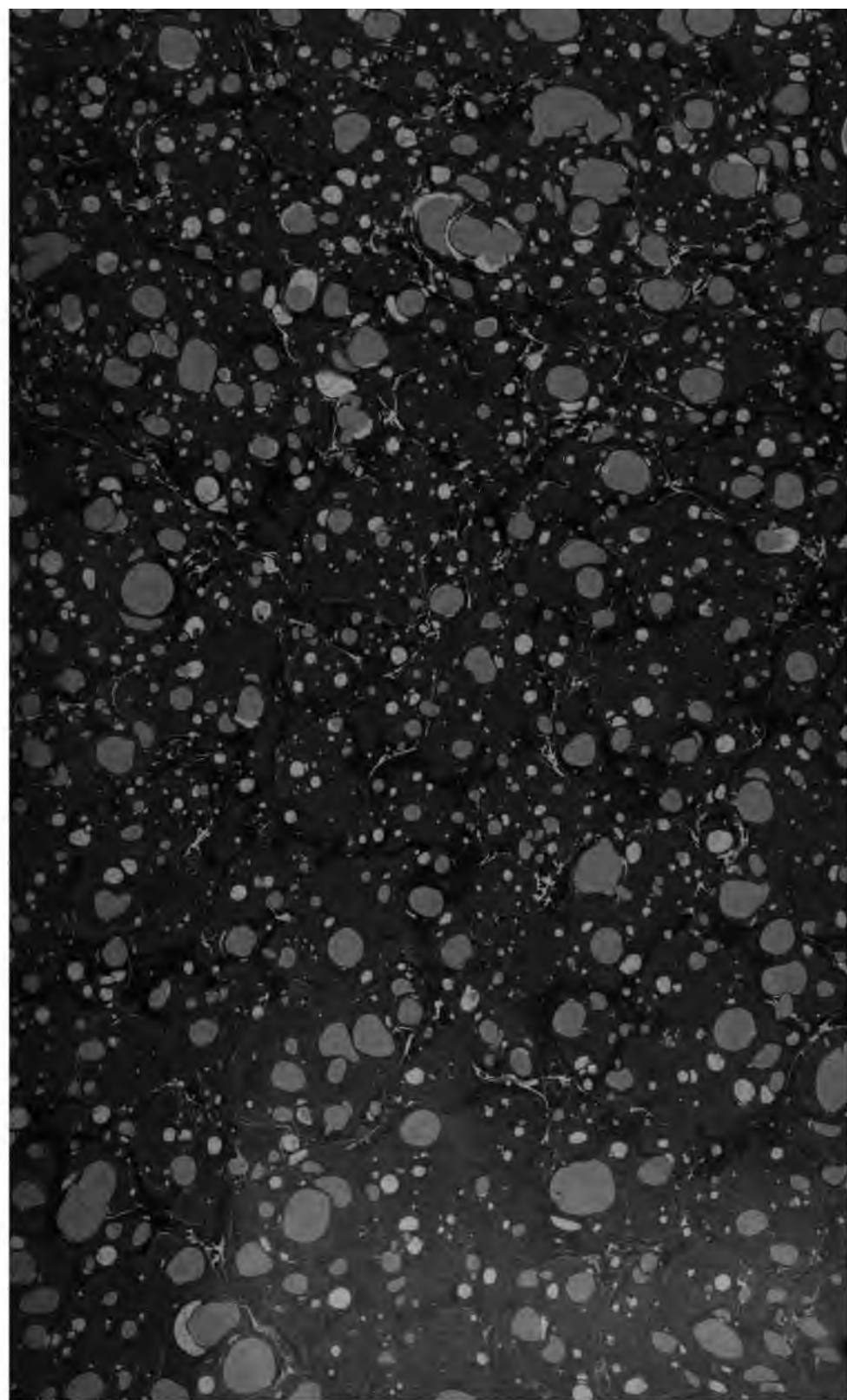
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No. 1-1881.

THE CONSTRUCTION OF LIBRARY BUILDINGS.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1881.

**LIBRARY OF THE
LELAND STANFORD JR. UNIVERSITY.**

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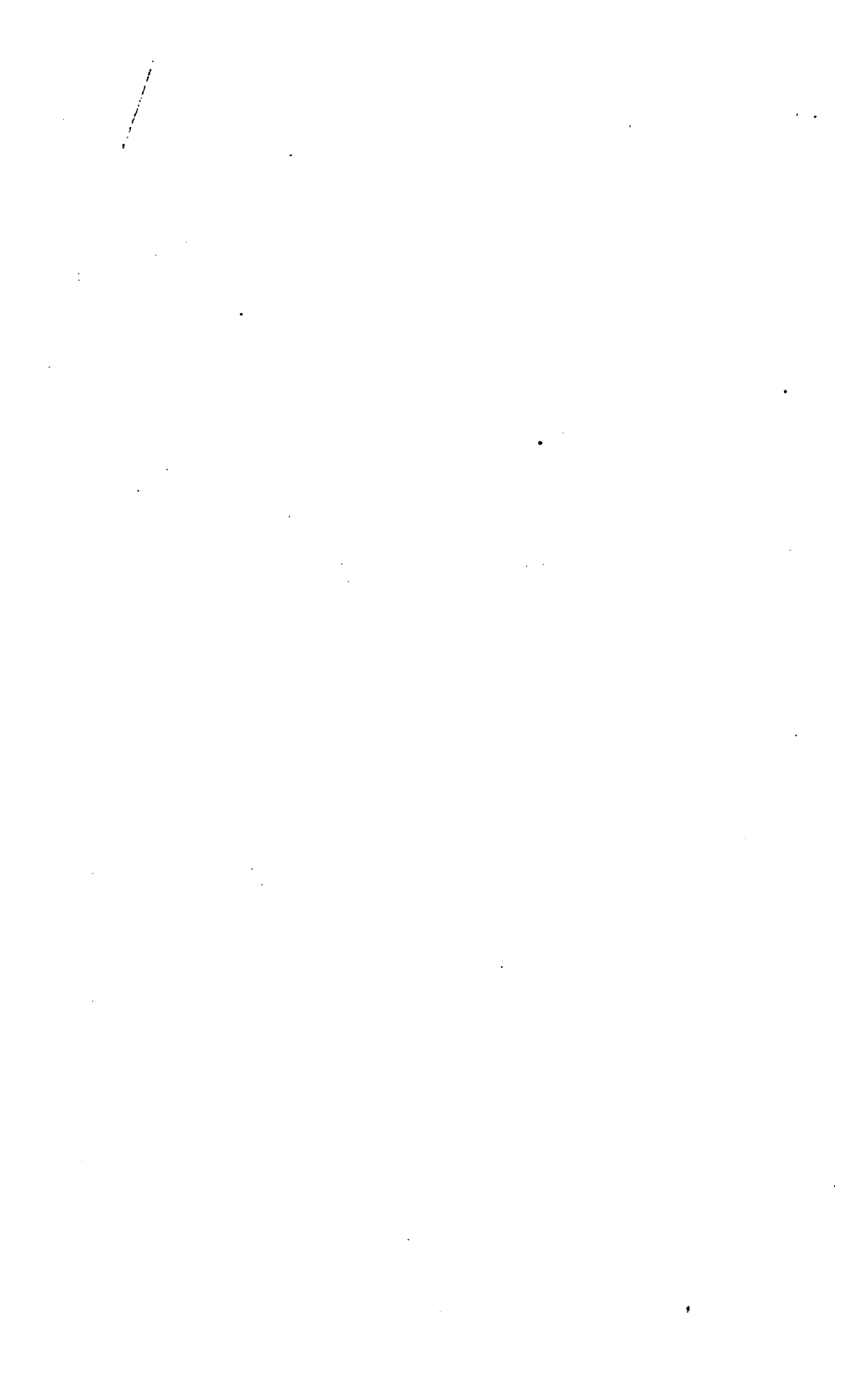
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LETTER.

DEPARTMENT OF THE INTERIOR,
BUREAU OF EDUCATION,
Washington, D. C., March 15, 1881.

SIR: The very important place which libraries occupy and are to occupy in the public culture of this country makes all thoughtful labor in their behalf of great interest. They are springing up over the country in many places, and those having 300 volumes or more number nearly, if not quite, four thousand, as reported to this Office.

Buildings for their storage and care are being erected or adapted in large numbers, and serious errors, involving great expense, are perpetrated, whereby their safety is imperilled, their convenient use hindered, and their increase in capacity almost forbidden.

Librarians have not been silent in these matters, but often the mischief has been done before the professional custodian of the books is employed, and thus before the needs of the library and of the community it serves are known.

At a recent meeting of librarians in this city, Mr. William F. Poole, the accomplished and energetic librarian of the Public Library of Chicago, read a paper on the construction of library buildings which excited marked attention and was received with great approval. The author has furnished this Office the article, on condition of its early publication, and many librarians of eminence (among whom I may mention Mr. A. R. Spofford, of the Library of Congress) have expressed their desire to see it speedily and widely circulated.

Mr. Poole does not pretend to formulate rules which must be rigidly followed, but to set forth the conditions for library buildings which experience has shown to be indispensable. These can be applied to the housing and shelving of every collection, be it great or small, by a moderate exercise of common sense.

This Office has always appreciated the function of the library in public education, and it is only in accordance with its past practice, so heartily approved of by the public, that I request your sanction for the publication of Mr. Poole's paper as a circular of information.

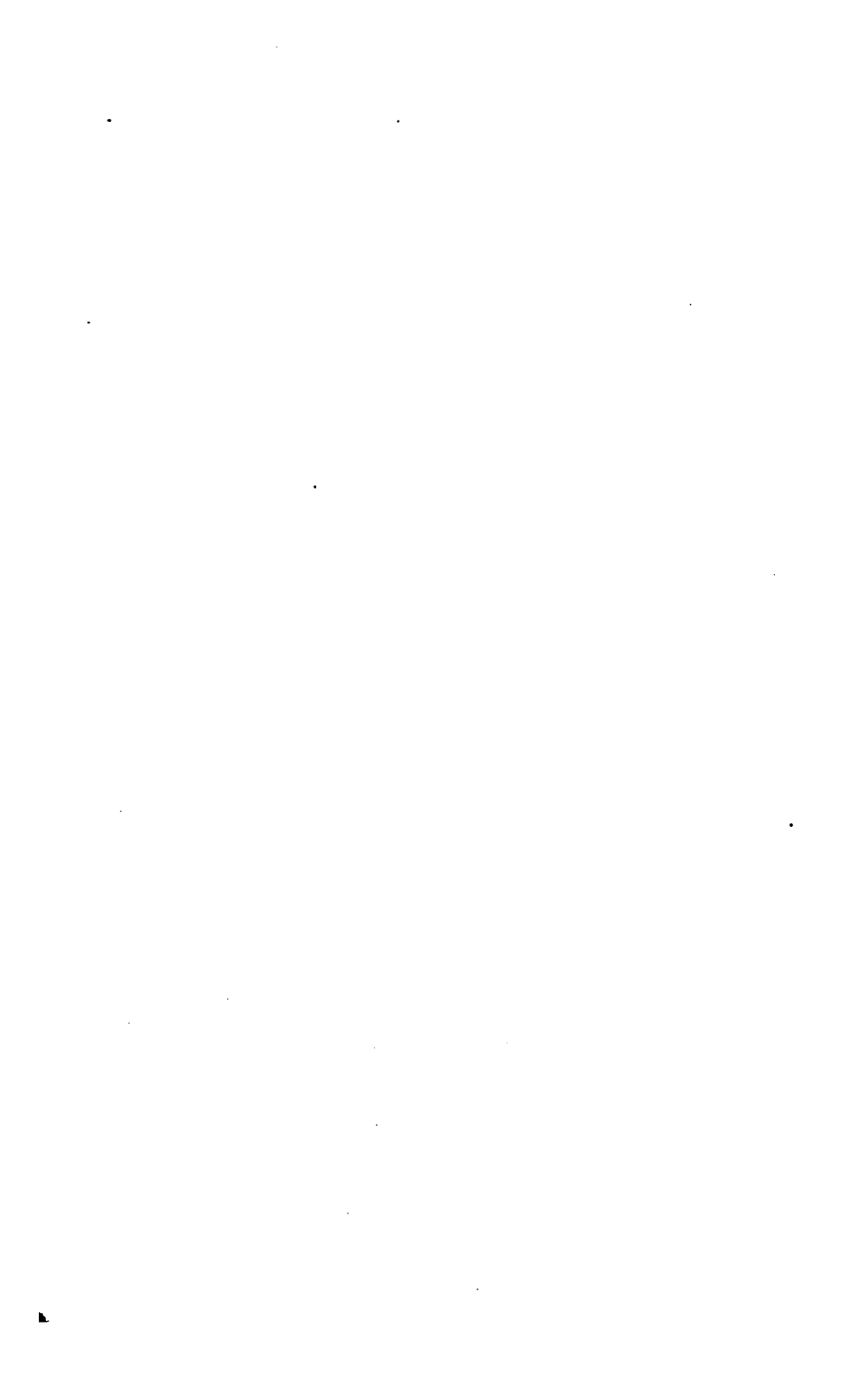
I am, sir, very respectfully, your obedient servant,

JOHN EATON,
Commissioner.

The Hon. the SECRETARY OF THE INTERIOR.

Publication approved:

S. J. KIRKWOOD,
Secretary.



THE CONSTRUCTION OF LIBRARY BUILDINGS.

By WILLIAM F. POOLE, *Librarian of the Chicago Public Library.*

The subject of library architecture came up for consideration at the last meeting of this association in Boston by having our attention directed to the construction of larger buildings than we have had experience with, of which several will be built in this country during the next five years. There was no time for a thorough discussion, and it was by common consent agreed that the more deliberate consideration of the subject should be resumed at the Washington meeting.

In the course of my remarks on that occasion, in which I made some suggestions as to the construction of this class of buildings, I said: "I know of no better rule to be observed in the library architecture of the future than this: avoid everything that pertains to the plan and construction of the conventional American library building." My present purpose is to explain and illustrate what I then could treat only in outline, and do some construction on my own account. I am convinced that the conventional style of library architecture is very faulty, and that we shall never have a general reform until better principles are applied to the construction of the largest buildings. The smaller libraries are constantly copying and perpetuating the confessed faults and worst features of the large libraries.

By the "conventional American library building" I mean the style of which the Boston Public Library, Boston Athenæum, Astor Library, Cincinnati Public Library, Baltimore Peabody Institute, Library of Congress, and others which I might mention are the representative types. All these buildings have lofty rooms and a large open space surrounded with alcoves and galleries which are used for the storage of books. Although these buildings have a variety of detail in other respects, this is the conventional style of which I speak. I might illustrate what I have to say by exhibiting the interior view of any one of them. I have selected, however, for this purpose the latest, the best, and the most carefully planned of all these buildings—that of the Peabody Institute of Baltimore. Here some of the objectionable features of the older buildings have been avoided and useful appliances and devices have been introduced. It is, however, with the general plan we are now concerned.

The main library hall, of which I show you a ground plan (Fig. 1) and an interior view (Fig. 2), is 84 feet long, 70 feet wide, and 61 feet high. On the front is the reading room, 72×36 feet, and in the rear a work

room, $38\frac{1}{2} \times 20$ feet, and the librarian's room, 18×20 feet. The alcoves are six stories high; they project 18 feet from the walls, and there is a passage way two feet wide next to the wall, for access between the alcoves, which are 12 feet apart. A skylight in the roof and two small windows in each alcove furnish ample light. The present shelving capacity of the room is 150,000 volumes. It is certainly a stately and imposing

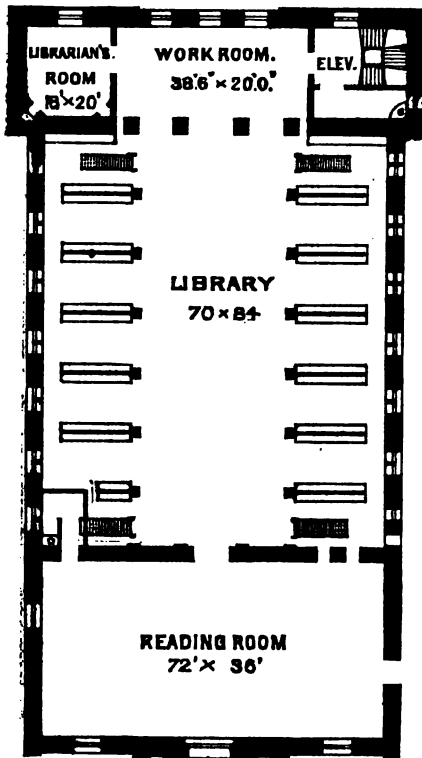


FIG. 1.—Ground plan of the Peabody Institute Library Hall.

structure; and if we will banish from the mind all considerations of convenience, utility, and economy, and regard its architecture simply as an æsthetic recreation, we may pronounce the picture before us beautiful. It is the nave and aisles of a Gothic church of the Middle Ages, with the classic associations of five centuries about it, brought down to the practical uses of a modern library structure. There are some objections to this venerable and conventional arrangement, and I will mention:

1. The wastefulness of space in this central portion of the building. Books are shelved only in the aisles; the nave is empty, and serves no other purpose than contributing to the architectural effect. Is not this an expensive luxury? Here is a solid block of vacuity, 84 feet long, 34 feet wide, and 61 feet high—more than half the capacity of the room—which can be applied to no possible use

in the storage of books. The floor can be used, and is used in most of the libraries of this class, as a reading room and as a general promenade for tramps and sight-seers. It is unfit, however, as we shall presently see, for a reading room; and the trustees of the Peabody Institute have had the good sense to provide another and suitable room for this purpose. The storage of books, therefore, is the only practical use to which this room is applied, and half its capacity is wasted in order to secure architectural effect.

2. The second objection I will mention is the difficulty and expense of heating such a room as this. In our northern climate fires are kept for six or seven months of the year, and for four of these months large fires. Hot air from a register or radiator rises to the ceiling like a balloon, and the upper strata become intensely heated before the lower

stratum, in which we live, has a comfortable temperature. This arrangement is a wasteful expenditure of heat. In the Cincinnati Public Li-



FIG. 2.—Peabody Institute Library Hall.

brary the unequal distribution of heat is partially obviated by warming the marble floor by means of steam pipes beneath the floor and draw-

ing off the heated air of the upper galleries by ventilation or cooling it in the lantern of the roof, which in winter serves as a refrigerator. This is done, however, at an enormous expense for fuel. The librarian informs me that 500 tons of coal are consumed in the library furnaces in an average season. He has sent to me tests of the temperature in different parts of the library, which he made on December 29, when the thermometer outside indicated 3° below zero, and also on the evening of January 4, when 120 gaslights were burning, which indicate that the temperature on both occasions was fairly equalized. Four years ago a friend of mine visited this library, and, observing the intense heat in the upper galleries, procured a thermometer and ascertained the temperature near the floor and in the upper gallery. Six feet from the floor it was 65° , and in the upper gallery 124° . Mr. Dyer, librarian of the Mercantile Library of St. Louis, writes to me, under date of February 3, 1881, that the temperature of his library hall on that day, 1 foot above the floor, was 64° ; 10 feet above, 74° ; 19 feet above, 82° , indicating that the increase of heat was about one degree for every foot of elevation. He adds that, during the summer, the mercury, two feet below the ceiling, frequently reaches 140° .

3. I object, in the third place, to the shelving of books in galleries *under any circumstances*, and especially in this instance, where the alcoves are piled one upon another, six stories high. I may group my objections under three heads:

(a) Because galleries are a wasteful expenditure of the physical strength of attendants in climbing stairs and of the time of readers in waiting for their books.

(b) Because the bindings of books in galleries perish from heat, and the higher the books are above the floor the more active is this destructive agency. Leather is an animal tissue, and will not, like linen, cotton, paper, and other vegetable substances, sustain without injury a higher temperature than we find agreeable to ourselves. Books cannot live where men cannot live. They are more nearly allied to us as congeners than we are wont to suppose. In excessive heat the leather of bindings slowly consumes and its life departs. If we put our friends in torment, they prove to us the doctrine of annihilation. Bindings perish from other causes, one of which is the presence of sulphuric acid in the leather. This acid is used in a process of the manufacture called "clearing," and from haste or negligence is not thoroughly extracted before the leather is finished. The sulphurous residuum of gas combustion is also said to be injurious to bindings. The burning of gas, I have no doubt, is very injurious to bindings in libraries of this construction, and chiefly because it raises the temperature in the galleries. In libraries bindings have no such aggressive and destructive an enemy as excessive heat. All the large libraries in this country and in Europe are lamenting its ravages, and often without a suspicion of the real cause of the deterioration. A well known architect of Boston recently called upon me, and, conversing

upon this subject, which was new to him, said that he frequently went into the galleries of the Boston Athenæum to consult books, and when he came down found his clothes covered with a fine red powder. He asked if I knew what that powder was. I replied that I had often observed the same fact in the same locality, and I had no doubt that it was the *ashes* of the bindings, which had been consumed by excessive heat.

Books should, therefore, be shelved in the coolest part of the room, where the air is never likely to be overheated, which is near the floor, where we ourselves live and move. In the private libraries of our residences a mistake is often made in carrying the shelving of our book-cases so high that they enter the upper and overheated stratum of air. If any one be skeptical on this point, let him test, by means of a step ladder, the condition of the air near the ceiling of his common sitting room on a winter evening when the gas is burning freely. The heat is simply insufferable.

(c) Besides the reasons already given, I object to the shelving of books in galleries because it is unnecessary. The 150,000 volumes, the present capacity of the Peabody Institute Hall, can all be shelved near the floor, where convenience in reaching them and their preservation require them to be. In order to exhibit this fact to the eye I ask your attention to this scale drawing of the floor (Fig. 3) with the book cases so inserted. The folios and quartos will be shelved in wall cases extending around the room, and the royal octavos and smaller volumes in double cases, open on both sides, three feet apart, the side alleys being three and a half feet wide, and the central alleys four feet wide. Instead of having two

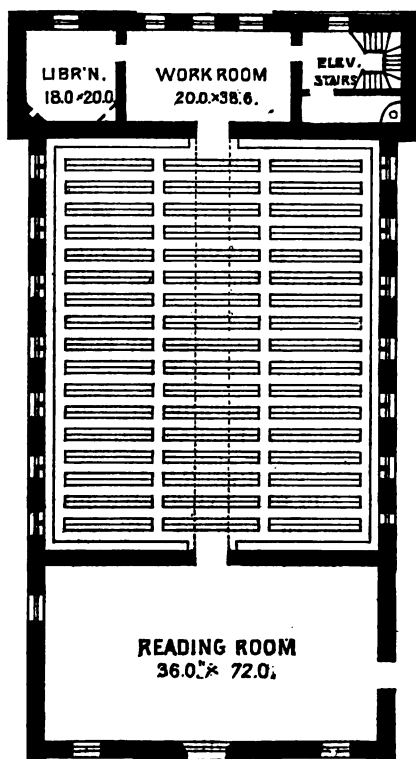


FIG. 3.—Ground plan of Library Hall with shelving supplied.

arrangement for this room would be to have a central alley five feet wide, which would give direct communication with the reading room from the work room and librarian's room. The cases will not be so high but that a person of average stature can reach any book without step or ladder, say $7\frac{1}{2}$ feet.

The rule for estimating the shelving capacity of any room of consid-

erable size arranged in this manner is to allow 25 volumes for each square foot of flooring. In this instance the capacity is 27 volumes per square foot, because the cases are longer than they are usually made. The shelving capacity of these cases is 160,050 volumes.

As I am to use further on, in some construction of my own, the estimate that each square foot of flooring will shelve 25 volumes, I will here explain how it is obtained. The double cases are 18 inches wide and of any desired length, say 16 feet. The space which one case will require is a rectangle, of which the longer side is the length of the case plus the width of the alley (usually four feet), or 20 feet. The shorter side is the width of the case (18 inches), plus the distance between the cases (three feet), or $4\frac{1}{2}$ feet. One case, therefore, requires 90 square feet of flooring. The area of shelving on one side of the case is $16 \times 7\frac{1}{2}$, or 120 square feet; on both sides, 240. The conservative rule usually adopted for estimating shelving capacity for books of all sizes which go to make up a general library is ten volumes for each square foot of front area. The capacity of the case requiring 90 square feet of flooring is, therefore, 2,400 volumes; and one square foot will shelve 26.6 volumes. Twenty-five volumes, therefore, to the square foot is a reasonable estimate.

By reducing the width of the alleys from 4 to 3 feet and the distance between the cases from 3 to $2\frac{1}{2}$ feet (in the stack room of Harvard College Library the distance is 2 feet 4 inches), the shelving capacity could be considerably increased. I have preferred to allow liberal spaces between the cases, and not to force the principle of contraction to its utmost limit. The estimate of 25 volumes to each square foot applied to large rooms brings out such enormous results as to be almost incredible.

We have now, in theory at least, shelved all the books which these six tiers of alcoves will contain upon the floor, and have space for 10,000 volumes more. We have, also, overhead, 61 feet of air and light, which is more than we need. Sixteen feet is better than 60, for it is enough. Three other floors, each of the same capacity, the rooms being 16 feet high in the clear, would fill the 61 feet and about 9 feet more. In the three upper stories the space which on the lower floor is appropriated to the work room and the librarian's room could be used for bookcases, and would shelve 76,800 volumes. The entire storage capacity of the building would therefore be 717,000 volumes. This arrangement, when the library comes to need so much shelving space, would allow of a classification of its books into four grand divisions or departments of knowledge, each one of which would have a floor and reading room to itself. The reader, then, by means of a modern elevator, would go directly to the floor on which the books in his own range of study are stored.

4. Returning to my general series of objections to the conventional style of library architecture, I mention, in the fourth place, the difficulty of getting about from one part of the library to another. Not to speak further of the burden of climbing stairs, it is necessary, in order to

move from one gallery to another on the opposite side, to travel on the outer edge of a parallelogram, when the economies of locomotion require that we move as nearly as we can in straight lines, and from the centre outwards. Observe the ease with which any case of books can be reached on this floor plan and the difficulty in the conventional plan of passing from a lower alcove to one in a remote corner of the upper gallery. In a popular circulating library it is positively cruel to send attendants for books with such an arrangement for shelving as this; and to station them in the overheated and stifling air of galleries to answer calls for books is even more inhuman.

5. I object, in the fifth place, to this plan of construction, on account of its insecurity from fire. In an interior finished with wood, no arrangement could be more skilfully devised for favoring the destructive operations of fire than a series of alcoves piled one upon the other six stories high, with every facility for draught—unless it be a pile of empty packing cases. When a building of this kind takes fire the work of the insurance adjuster is very simple, for it is a total loss of the whole library. Water, heat, and smoke are as fatal to books as fire itself. The Library of Congress has twice been burned; Harvard College Library, once; so also the Chicago Historical Society's Library, in what was thought to be a fire proof building; and the Birmingham Free Library, which several of us visited little more than three years ago, has since, with its great Shaksperian and Cervantes collections, been burned with fire, and nothing of its more valuable treasures saved. The class of library buildings which we are now considering will contain books, manuscripts, and public records of inestimable value which money cannot replace. To lose one of these libraries by fire would be a national calamity. After all that may be done in the way of external protection, there is still a large risk from internal accidents.

On a summer evening, a few years ago, a fire broke out in one of the rooms of the Cincinnati Public Library after the building had been closed for the night. It was fortunately discovered and extinguished before much damage was done. The origin of the fire was at first a mystery; but it soon appeared that the painters, who had been finishing the woodwork of the room, had left their oiled rags on the ledge of one of the bookcases when they quit work at night, and these had ignited by spontaneous combustion and had set the bookcases on fire. The Birmingham Library was set on fire in the daytime by the lamp of a careless plumber who was thawing out the gas pipes. A fire may start in a large library at any time by accidents as unusual as these; and it were a shame if, from errors of construction, it be allowed to range through the whole building. Hence, buildings such as we are considering should be constructed in a series of fire proof compartments, in order that the fire may be confined within narrow limits. I am not aware that this precaution ever has been taken. The principle, however, has been applied to the great ocean steamers, and many a ship has

been saved by having its hull divided into several water tight compartments. A practical method of securing this protection will be considered later in our investigation.

6. In all the libraries of this class in our country, except the Peabody Institute, the open space in the nave of our old Gothic church is used as a general reading room; and in the Peabody Institute, where another reading room has been provided, tables have been placed in front of each alcove, cutting off public access to them, at which students may study if they choose.

There are several objections to the use of this open space for that purpose. It is too public and bustling a place for quiet study. Here the business of the library is done. Readers are applying to the custodians for books and attendants are running about on the marble floor delivering their orders and taking new instructions. The emptiness overhead is appalling. Crowds of visitors and sight-seers are marching by, admiring the architecture, expressing their views on what they see, and asking each other in audible tones if they suppose the librarians have read all these books and know what they contain. One engaged in study hears remarks which were not intended for his ears and sees sights which distract his attention. I said at our meeting in Boston: "It is like attempting to study in Scollay square or on a mall of Boston Common." Those of you who have visited the reading room of the British Museum will remember the strict precautions which are observed to secure perfect quietude in that sacred precinct. Applications for books are made in writing; and if it be necessary for readers to speak to the attendants, the conversation is in a tone so subdued that no reader can hear it. No person can enter the room unless it be for study, and he must show his ticket. The American librarians who, three years ago, were the guests of Mr. Garnett, the superintendent, were taken to an elevated position overlooking the floor, and the details of the arrangements were explained in whispers.

7. The seventh objection I will mention to this style of architecture is the difficulty of enlarging it. How is this building to be enlarged when the growth of the library demands an extension? Shall it be extended heavenward, and more galleries be piled on these, with more wasted space in the nave, greater difficulty of access to the books, and more extravagance in the heating? Shall transepts and a chancel be built, so that the plan will represent the true ecclesiastical cross? However pious these improvements and gratifying to the taste of the refined architect, they are expensive, they involve demolishing much that has already been constructed, and they will give but little additional room. Why library architecture should have been yoked to ecclesiastical architecture, and the two have been made to walk down the ages *pari passu*, is not obvious, unless it be that librarians in the past needed this stimulus to their religious emotions. The present state of piety in the profession renders the union no longer necessary and it is

time that a bill was filed for a divorce. The same secular common sense and the same adaptation of means to ends which have built the modern grain elevator and reaper are needed for the reform of library construction.

Any plan for library construction is faulty which does not foresee and provide for future enlargement. The Boston Public Library, with a building like this, has for ten years been struggling with the problem of enlargement, and has at last solved it by resolving to abandon the building and the site with all the ingenious devices and expensive improvements made upon the premises during the past quarter of a century. Last winter the city council of Boston petitioned the legislature of Massachusetts for the gift of a block of land in the Back-Bay District for the Public Library, and the petition was granted. Much trouble and expense had been saved if the hopeless and temporary schemes of enlargement, such as dividing the alcoves by double bookcases, had been abandoned years ago. There is probably no library building in the country which has been so much admired (by non-residents) as that of the Boston Library, and none whose worst features have been so generally copied by the smaller libraries. The Astor Library makes its enlargement by erecting another and similar building on an adjacent lot. Its third building is now in process of erection.

The trustees of the Peabody Institute have provided for the increase of its shelving capacity in the same manner as was done in Boston, by dividing its alcoves with double cases. In anticipation of this change two small windows for each alcove were originally made in the side walls, which will light both sides of the double cases when they are built. It is obvious that this arrangement will be a blemish to the architectural effect of the interior. These many windows serve in winter, by their leakage and radiation, to reduce the excessive temperature of the upper galleries ; but it is done at an enormous waste of heat.

8. My eighth objection to this sort of library construction is its great cost, compared with a simpler, less pretentious, and more convenient style. The inclosure of so large and high a room as this requires that the outer walls, the girders, and the roof be of unusual weight and cost. The lantern or skylight in the roof, which ought to be wholly of iron and glass, is expensive. The structure whose plan is before you cost \$342,000, which includes the cost of two lecture rooms beneath and two art rooms above. The Boston Public Library building cost \$325,000. The Cincinnati Public Library, with a capacity of 250,000 volumes, cost \$350,000. The two structures of the Astor Library, and the third not yet completed, all with a capacity of 300,000 volumes, will cost \$398,000. It is a practical question, allowing the plans of these buildings to be the best that can be devised, whether these are not too large sums to be expended for such limited accommodations. Is it not lavishing upon the casket what ought to be spent on the jewels ?

I will not detain you longer in discussing this part of my subject. I

think I have said enough to justify the statement with which I started out, that I know of no better rule to be observed in the library architecture of the future than this: Avoid everything that pertains to the plan and construction of the conventional American library building.

Up to this point I have freely passed judgment upon the plans and buildings of others. I am now to do some construction of own. "It is easy," says the old proverb, "to criticise; it is not easy to construct." I have no pride of opinion that can be wounded by any strictures which may be made upon my plans. I offer them to be criticised. My only purpose is to secure better principles in our library architecture, and this can best be done by a free interchange of opinions held by practical librarians. I therefore cordially invite any librarian, architect, or other person present whose building or plans I have criticised, to take his full measure of revenge upon my work when I have concluded.

In the plans I now lay before you, I propose, on a lot of ground 200 feet square, the construction of a building for a reference library of 1,000,000 volumes; and, in order that the library may grow, I expect, upon the same lot, without cramping the space for storage or changing anything that has been constructed, to provide for 2,000,000, and later for 3,000,000, volumes. By doubling the size of the lot to 400 × 200 feet, 6,000,000 volumes can be provided for. It is proposed to erect no more of this building than is needed to meet present wants and that additional compartments of similar construction shall be built from time to time as they are required. In devising this plan I have sought to secure the following results:

1. That the building shall be constructed in compartments and as nearly fire proof as is possible, so that, if fire starts, it shall be confined in the compartment in which it originates and the rest of the library be saved.
2. That waste room shall be reduced to a minimum; that convenience and utility shall never yield to architectural effect; and that the building shall be easily and economically heated.
3. That more spacious and convenient quarters than we now have shall be provided for the administrative department and the working rooms of the library.
4. That there shall be no climbing of stairs for books and no overheating of bindings in galleries.
5. That greater facility of communication between different parts of the library shall be secured, and that the books shall be shelved near the floor, and no higher than they can be reached without step or ladder.
6. That quiet accommodations shall be provided for readers; that separate rooms be assigned to special subjects and furnished with such special arrangements as they need for their storage and use.
7. That the cost of construction shall be kept within reasonable limits;

and that convenience, utility, and economy shall be the controlling principles in the design.

I do not claim that my plan is the only one that will meet these requirements, but simply that it is one such plan; and, if it serves no other purpose, it may suggest a better design. It has at least the novelty, if not the merit, of being a radical departure from the beaten track.

My first requirement is a lot of ground 200 feet square, surrounded on all sides by streets, or, what is better, by other open space. On the middle of the side most appropriate for the main entrance I place the

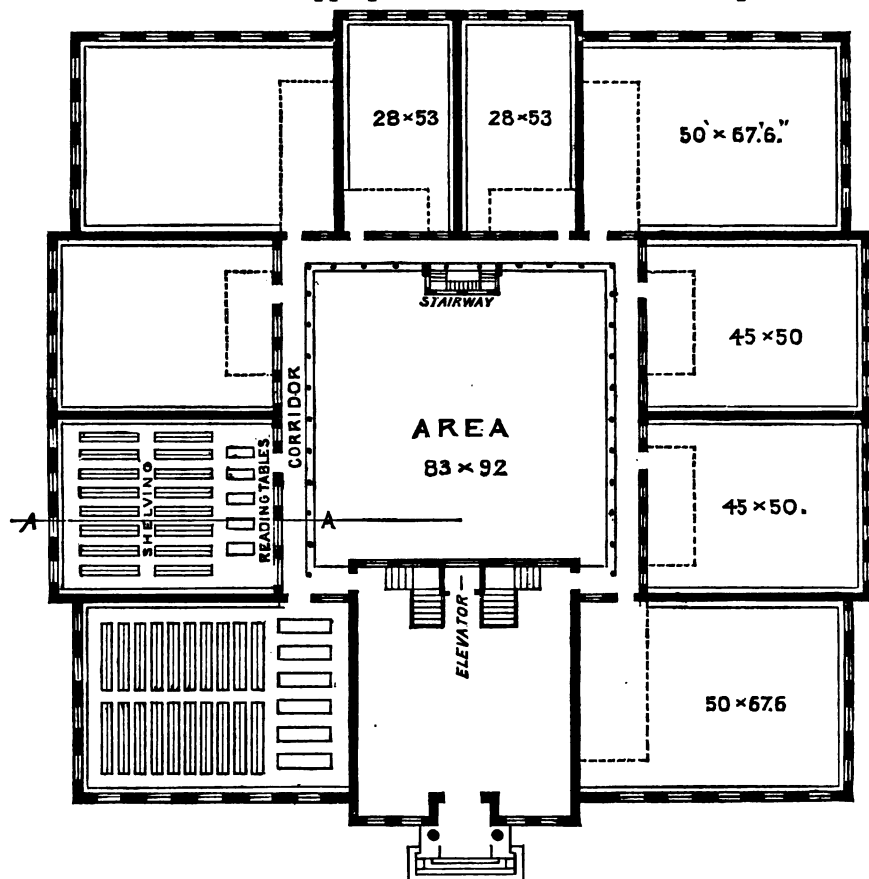


FIG. 4.—Ground plan of proposed library building.

central building, 60 feet front and 75 feet deep, which will be wholly devoted to the administrative superintendence and work of the library. Here will be the offices of the librarian and heads of departments, the catalogues, the most general works of reference, and here the business of the library will be done. Here will be apartments for the cataloguers and for unpacking and arranging books. The bindery will occupy the upper story.

The books will be stored, not as now in one general repository, but in a series of rooms thrown out as wings from the central building, and extending around the lot. These rooms will be 50 feet wide, 16 feet high, and as long as it is convenient to make them. The width of the wings will be determined by the space that can be well lighted by side windows and that can be spanned by iron girders without pillars. Ten of these rooms are indicated on the plan before you, and, carrying the same construction four stories high, there will be 40 of these rooms in the whole structure. Each of the rooms will contain the books on some special subject, or, in the early stage of growth, several related subjects. One room will be devoted to the fine arts, and will have the proper cases, tables, and other appliances for shelving and studying the large and expensive illustrated works which belong to such a collection. Another room will have the mechanic arts, with such other arrangements as are required. Another room will contain history, and, when the library has grown to a million volumes or more, perhaps American history only. Political economy and social science will be found in another room, and so on through the different classifications of knowledge. These rooms will have no alcoves nor galleries, for alcoves I regard as useless and galleries an unpardonable nuisance. The books

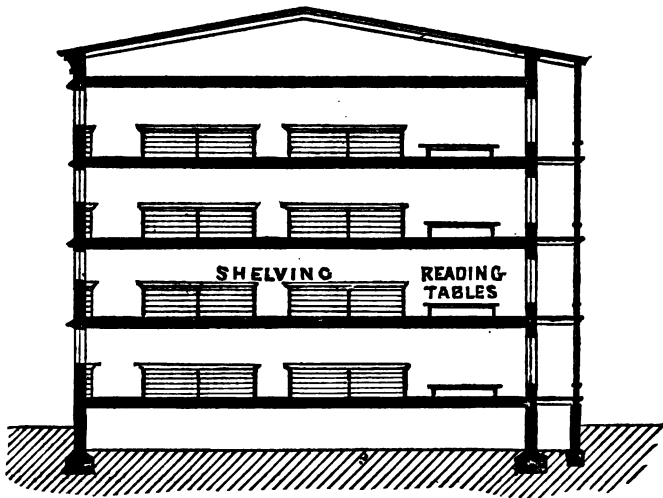


FIG. 5.—Sectional elevation on line A A of Fig. 4.

will be shelved in wall cases and double cases not higher than a person can reach. The plan of shelving the books is the same which I have already described in speaking of the floor plan for the Peabody Institute. High light will be taken on the exterior side from windows above the wall cases. Each room will have light from two sides, and will be furnished with tables, chairs, and all the conveniences for quiet study. The reading desks will be on the inner side where there are no wall cases, and hence the windows looking into the quadrangle will be of full

length. The attendant in charge will have an opportunity to become acquainted with the books in his department and competent to assist readers in their investigations.

There is, therefore, no occasion or need of a general reading room other than the one in which are kept the encyclopædias, dictionaries, and the general works of reference. Special dictionaries may be shelved with their own departments, and to some extent general works of reference may be duplicated. When it is necessary, books can be loaned from one department to another, as they are now sent to the reading room. The building will be supplied with telephones and all the modern appliances for communication. As a general rule, readers will go to the room which contains the class of books which they wish to study.

As a protection from fire, each room used for the storage of books is cut off from every other room by a brick fire wall extending through the roof. The only access to these rooms will be by a light iron corridor at each story, seven feet wide, running around on the inside of the quadrangle, as indicated on the plan (Fig. 4). In winter these corridors may be inclosed by glass windows, which can be removed in the summer. The long windows in the quadrangle will give abundant light, notwithstanding the small amount which will be intercepted by the corridors. Every floor will also be made thoroughly fire proof. They will be laid on rolled iron beams supported by lattice girders, the space between the beams being filled with porous terra cotta, and the beams will be covered with concrete, upon which the flooring will be laid. The girders will also be protected by an ornamental covering of terra cotta, which will serve as a decoration for the ceiling of the room below. Without such covering, iron, in case of fire, is the most treacherous of all building material. If by accident fire should start in any one of these forty rooms, it could not endanger the safety of the other thirty-nine.

This arrangement of access to the rooms by means of corridors serves another purpose besides being a protection from fire. It is a protection against tramps and sight-seers, who would be marching in crowds through these wings if there were a passage way through them, as in the Louvre at Paris. Such a passage way would take up a good deal of room, would interfere with the arrangements for shelving the books, and would disturb the quietude which is needed for study. It is a delusion to depend on iron doors between the rooms as a protection from fire; for, in such an emergency, iron doors are always found to have been left open.

In the rear of the central building will be an elevator, which will land readers upon the level of any of the corridors. As the central building will not be used for the storage of books, it will have stairways, besides the elevator, for reaching its several stories. In case of accident to the elevator, the stairways can be used for access to the upper corridors. On the rear side of the quadrangle there will be a stairway connecting the several corridors. If time allowed I might speak of other details of construction.

We will now consider the storage capacity of this building, and first of a single floor. Deducting the space covered by the walls, there are 25,250 square feet of flooring in these wings. Deducting still further one-fifth of this space (or 5,050 feet) for the tables and other accommodations of readers, we have 20,200 feet which can be used for book-

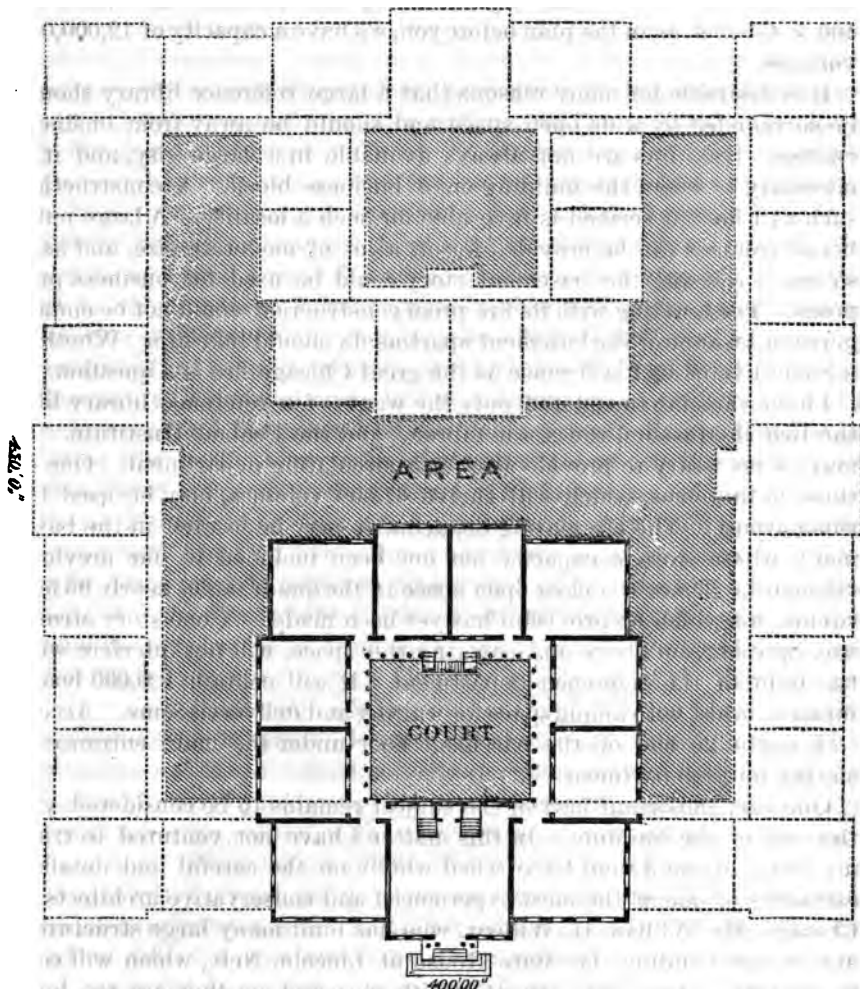


FIG. 6.—Ground plan of library building with extension.

cases. By the rule we have already demonstrated, that each square foot will shelve 25 volumes, we have for the shelving capacity of this story 505,000 volumes, and of the four stories, 2,020,000 volumes. The ceiling of the upper story is only 69 feet above the lower floor, and, if more space be needed, the walls may be carried two stories higher, which will give accommodations for another million volumes. The walls will then not be higher than many of the blocks in our commercial

cities, which, by means of elevators, are used as business offices to their upper stories.

By extending the front wings 100 feet on each side and carrying them back to the rear line, leaving an area 50 feet wide for light and ventilation, we have accommodations for 3,000,000 volumes more, or 6,000,000 on a lot of 400×200 feet. By extending this construction over a lot 400×450 feet, as in the plan before you, we have a capacity of 12,000,000 volumes.

It is desirable for many reasons that a large reference library should be surrounded by wide open space and should be away from business centres. Such lots are not always available in a large city, and it is necessary to erect the building on a business block. A construction such as I have described is favorable for such a locality. A large number of volumes can be provided for on a lot of moderate size, and as a source of revenue the basement story could be used for business purposes. The building with its fire proof construction would not be endangered in case one of the basement apartments should take fire. Whether it could live in such a furnace as the great Chicago fire is a question.

I have thus far considered only the wants of a reference library like the British Museum, the Astor Library, and the Peabody Institute. It may be necessary to provide also for a circulating department. One of these front rooms, which will shelve 67,500 volumes, may be used for this purpose. The circulating department may be located in the basement, whose storage capacity has not been included in our previous estimates. There is a clear open space in the quadrangle, nearly 90 feet square, for which no provision has yet been made. A one-story structure, lighted from above and covering this space, will not interfere with the light of the reference department. It will contain 120,000 books for circulation, with ample space for waiting and delivery rooms. Access to it might be had on the basement floor under the main entrance to the reference department.

One very important part of the subject remains to be considered, viz, the cost of the building. In this matter I have not ventured to trust my own judgment, and have relied wholly on the careful and detailed estimates of one of the most experienced and conservative architects in Chicago, Mr. William H. Willcox, who has built many large structures, and is now building the State House at Lincoln, Neb., which will cost \$1,250,000. I have his estimates with me; and, as they are too long for me to read, I will only state the results.

The estimates are made on a building such as has been described, covering a lot 200 feet square, five stories high, including the basement, and having a capacity of shelving 2,000,000 volumes. The exterior will be of sandstone, in simple yet characteristic design. The building is to be absolutely fire proof, with brick walls and iron beams, iron window frames and sashes, and steel inside blinds to all exterior windows. The interior iron work will be covered with porous terra cotta or other fire resisting material. The floors in the book rooms will be of hard wood

and in the vestibule and inside corridors of tiling. The walls of the same will be wainscoted in stone and tile. The cost of the building complete, including the steam apparatus for heating, but not including the shelving and furniture, will be \$530,000. The shelving, which will be of hard wood, with the furniture, will cost \$110,000, making the entire cost of the building in readiness for occupation \$640,000. The cost of construction, on the basis of storage capacity, in the Boston Public Library, is \$1.30 a volume; in the Astor Library, \$1.33; in the Cincinnati Public Library, \$1.40; and in the Peabody Institute, \$2. In the plan I have laid before you, the cost of construction, estimated on the same basis, is 32 cents a volume.

I will take no more of your time in presenting this subject, and shall now be happy to reply to any inquiries which may be made.

A discussion followed the reading of the paper. The remarks appended were made by Mr. A. R. Spofford, librarian of the Library of Congress; by Mr. Lloyd P. Smith, librarian of the Philadelphia Library Company; by Mr. John Edmands, librarian of the Philadelphia Mercantile Library; and by Mr. Poole, in explanation of the purpose of the paper, which had been misunderstood by several of the speakers, but not by those named above.

Mr. SPOFFORD. If there were no other cause, Mr. President, why we should all be grateful to our veteran colleague from Chicago whose lucid and interesting paper has been read than its suggestions for preventing the overheating of books and libraries, that alone would entitle him to a high meed of praise. If you go into the upper galleries of the Library of Congress on any day of the winter and take a book from the shelves, the chances are that it will almost burn your hand. It has often occurred to me that if these warped and shrivelled and overheated volumes were not inanimate beings, if they could only speak, they would cry out with one voice to their custodians: "Our sufferings are intolerable." In the library I speak of, moreover, there is only the injury resulting from the rising heat to which the books are subjected, since no gas is burned. When to the fearful and almost incandescent heat that gathers under every ceiling is added the well known destructive influence of coal gas, burned through many hours of each day, the effects upon the books and bindings are simply deplorable.

Now, by the simple and ingenious expedient graphically represented before you by our Chicago colleague all the deleterious effects of overheating are got rid of. By the mere method of construction, the lofty upper stories are abolished; each floor for the storage and arrangement of books being only sixteen feet high, all the books are within easy reach from the floor, and the upper half of every library room is devoted, not to the concentration of heat, but to its dispersion or ejection, which is effected by windows that supply at once a maximum of light and of ventilation.

It has been suggested that most librarians are unable to avail themselves of this or of other marked reforms in the methods of library construction because, unhappily, their libraries are already built. But it is also true (is it not, Mr. President?) that most, if not all, of them have got to be rebuilt. Whether, therefore, if one take the case of an entirely new library building of the first magnitude, as in Washington or in Chicago, or the case of a little or an ill contrived library edifice anywhere that has outlived its usefulness, we have here most invaluable suggestions to aid us in determining the most expedient method of planning and constructing. I look upon this information and discussion as of the first importance among our labors in this convention, and, whatever might be our conclusion as to the details of the scheme, I hail the special improvement of which I have spoken as one of great practical value.

Mr. SMITH. Mr. Poole's plan of a fire proof library is highly original, and deserving of serious consideration by those who have occasion to erect new library buildings. With all the care that can be used in the choice of materials, a room containing books in galleries, one over the other, is in danger from fire, and the bindings suffer in the upper galleries, not only from furnace heat, but, in our climate, from the heat of the sun as well. The farther books are from the ceiling the better for their bindings. I am not, however, prepared to give up the idea of a central reading room, like that of the British Museum; but the plan of separate rooms for the storage of books, each fire proof in itself, has the experience of the city of Paris to recommend it and will probably be found to be best for the library of the future.

Mr. EDMANDS. In some remarks which have been made upon Mr. Poole's paper it seems to me that his purpose in its presentation has been misunderstood. It appears to be assumed that his object was to present a definite plan for a library building. I do not so understand him. I have not supposed that he presented this as the plan for the new building for the Chicago Public Library nor for the Library of Congress. It seems to me he intended his paper and his sketches as a study on the subject of library construction. He has attempted to show one of the ways in which a library building can be constructed that shall be free from many of the admitted defects of those most in vogue, and that shall be superior to them in the great essentials of such a building.

Mr. POOLE. Mr. Edmands has correctly stated the purpose of my paper. It is a study in library construction, and not a plan for any special library, unless it be one which comes within the precise conditions I have named, "a reference library of a million volumes." I might, applying the same principles, have worked out the details and placed before you the plan for a smaller library. Then the question would have been asked, "How do these principles apply to the construction of the largest libraries which will be needed in this country?" I have preferred to meet this latter inquiry first. At some future time, if it be necessary,

I may show their application to smaller libraries. This, however, I hope the members of the association will do for themselves. I have pointed out the special faults in the popular style of library architecture, and have suggested how they may be avoided. The principles which I have discussed require a specific adaptation to each individual library, for the conditions of no two libraries, as to size, growth, means, objects, and readers, are precisely alike.

On the next day Mr. Edmands offered the following resolution, which was unanimously adopted:

Resolved, That, in the opinion of this association, the time has come for a radical modification of the prevailing typical style of library building, and the adoption of a style of construction better suited to economy and practical utility.

APPENDIX.

The following extract from a letter addressed by Dr. N. H. Morison, of the Peabody Institute, to Mr. Poole will explain itself:

"I was very busy when your letter came, and I have waited till I could answer your questions by actual experiments. For several days I have had thermometers in our alcoves to test the temperature, and will give you the results:

"We use our main hall for a certain class of readers, and keep it at about 68°, sometimes 70°; seldom above. The alcoves, which are 8 feet high and completely floored over, have a passage way next the wall, and no heat is supplied to them except what may enter from a horizontal motion of the air from the main hall. Each alcove has two small outside windows, and there is much leakage around them. The alcoves all over the building are too cold in winter for work in them. I placed three thermometers in each of the stories, one next the main hall, but inside the alcove, where the first books are placed, one in the middle of the alcove, and one about 18 inches from the window sash. The thermometer stood outside, in the open air, at from 36° to 38°. I give the temperatures in the central hall for reading (not reading room) and on each of the stories in this order: window, middle, front next hall:

"Hall, 68°; 2d story, 57°, 66°, 67°.

"Hall, 67°; 3d story, 58°, 65°, 66°.

"Hall, 66°; 4th story, 62°, 66°, 67°.

"Hall, 66°; 5th story, 61°, 64°, 65°.

"Hall, 66°; 6th story, 62°, 65°, 66°.

"As I used but 4 thermometers and began with the sixth story, you will perceive the temperature in the hall alcove increased as the day advanced. I tried these over several times, with essentially the same results. I then ranged the thermometers over each other in the different stories:

"Hall, 66°.

"4th, 67°.

"5th, 67°.

"6th, 68°.

Hall, 69°; hall, 68°.

1st, 60°; 4th, 62°.

2d, 60°; 5th, 63°.

3d, 60°; 6th, 64°.

"On front next main hall, the warmest place.

"Thermometer near windows, the coldest place.

"I tried it repeatedly and found the wall side of the sixth story almost uniformly 4° colder than the reading hall below. I was myself surprised at this, and it must be owing to the construction. The central hall is about 15 feet higher than the highest alcove, and the warmest air goes there. The hall is heated by pipes laid under gratings in the floor, and keeps the lower part of the room warm without excessive heat above. The alcoves have no heat whatever in them and are cooled by the windows.

"These experiments show conclusively that there is no danger of injury to the books from heat even in the highest of the alcoves. In summer these high alcoves are excessively warm from the glass roof, not over them, but over the main hall.

"Although I planned this library building, from 'turret to foundation stone,' I have no especial prejudice in favor of this type of structure. It is the only one that will make a handsome room while it furnishes large space for books. Our trustees decided, by a unanimous vote, on a building of this type. Mr. Peabody had requested that the

building should be an ornament to the city. I did not think it would be wise or becoming in me to resist this decision, but set myself to make the most convenient building I could under these conditions. The beauty of the room is acknowledged by every one who has seen it. We have tested its conveniences nearly three years, and we see very few things that we could improve; in fact, I know of but one.

"You ask for the cost. You know that our building is not simply a library, but accommodates a conservatory of music and a gallery of art and lectures. The entire lot cost \$167,572.48; the entire building, \$517,086.90. The entire sum spent on lot and building was \$684,659.38. The part of the building which contains the library cost \$342,055.85."

CIRCULARS OF INFORMATION

OF THE

BUREAU OF EDUCATION.

No. 2-1881.

THE RELATION OF EDUCATION TO INDUSTRY AND TECHNICAL
TRAINING IN AMERICAN SCHOOLS.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1881.

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"You will see the room. You know that our building is not simply a library, but a museum and a university of music and a gallery of art and literature. The entire building cost \$100,000; the entire building, \$100,000. The entire sum spent on the building was \$100,000. The part of the building which contains the library cost \$100,000."

CIRCULARS OF INFORMATION

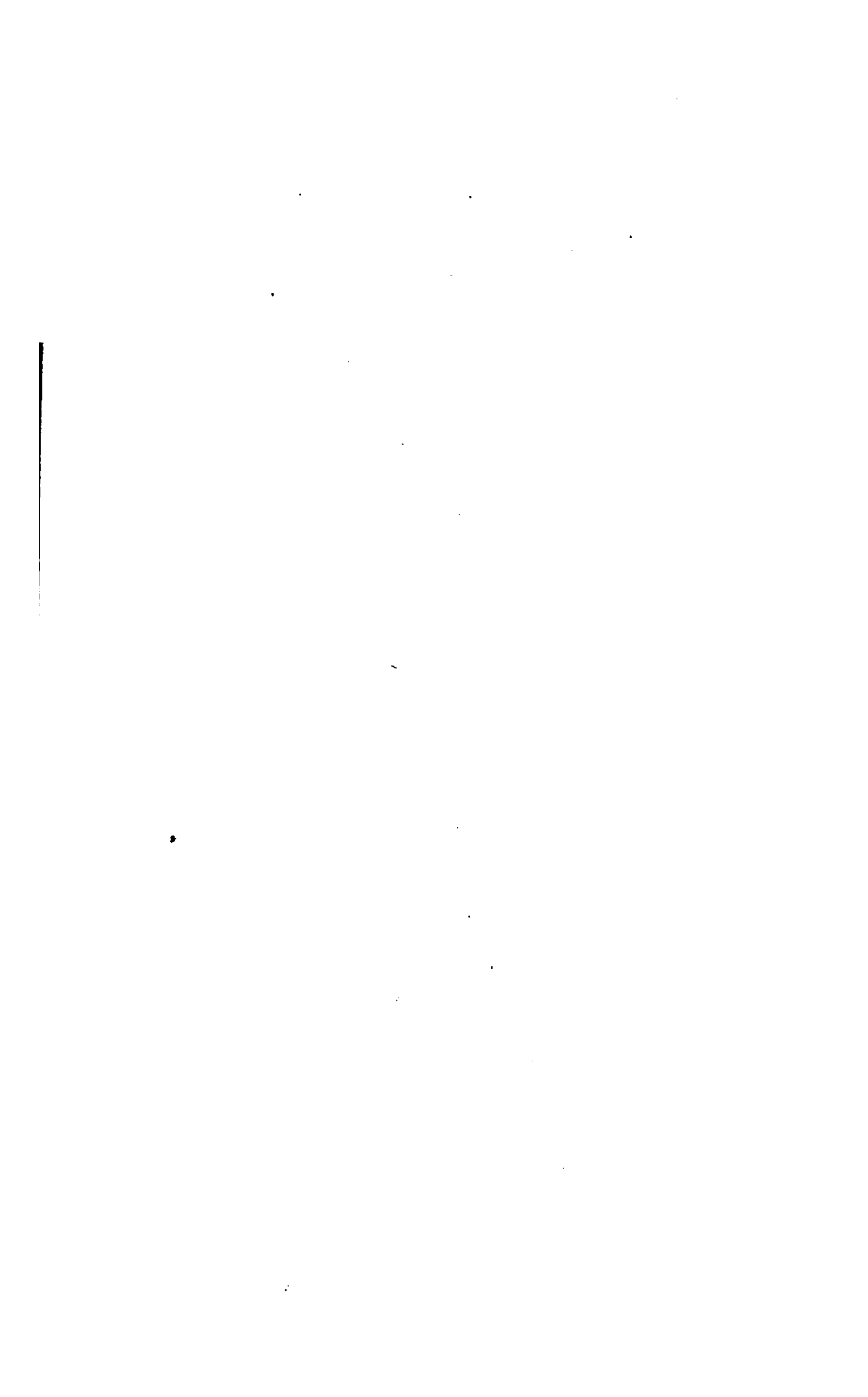
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LETTER.

DEPARTMENT OF THE INTERIOR,
BUREAU OF EDUCATION,
Washington, D. C., May 25, 1881.

SIR: The papers transmitted with this letter—"The relation of education to industry" and "Technical training in American schools"—are by E. E. White, LL. D., formerly State commissioner of common schools in Ohio and now president of Purdue University, in Indiana.

Dr. White as an educator is one of the most prominent and successful workers in this country. He has given special attention to the topics herein discussed, and his papers will meet a growing demand among the correspondents of this Office.

I therefore have the honor to recommend their publication as a circular of information.

Very respectfully, your obedient servant,

JOHN EATON,
Commissioner.

The Hon. the SECRETARY OF THE INTERIOR.

Publication approved:

A. BELL,
Acting Secretary.



TECHNICAL TRAINING IN AMERICAN SCHOOLS.

The American people are awakening to the importance of technical training, so universally recognized in the older countries of Europe. The rapid exhaustion of the natural fertility of our soil, the wonderful increase in the variety of our manufactures, and the marked improvement in the taste of our people, largely the result of general education, all demand higher technical knowledge and skill on the part of the American workman.

This increasing demand for better work has been attended by a steady decline of the apprentice system, which hitherto has been our chief reliance for the training of artisans. It is becoming more and more evident that if this decay of apprenticeship is not made good by technical training in some efficient form the American manufacturer will be at the mercy of the skilled labor of Europe. The railroad, the steam ship, and the telegraph have largely destroyed industrial isolation, and all skilled labor is subject to a world wide competition. The American artisan must compete with European workmen in skill or retire from the shop and surrender the market. The day of muscle in industry has passed, and the day of mind, with skill of eye and hand, has dawned.

The necessity of technical training being conceded, how can it best be provided? This, as is seen, involves the question to be considered in this paper, viz: "What is the place of technical training in American schools?" And this involves the further question: "To what extent can technical training be given in our public schools?" It seems to the writer that the time has come when an attempt to answer these questions involves no assumption of superior wisdom. A vast amount of information respecting technical schools and technical training in other countries has been collected, and experiments have gone far enough to furnish the requisite data for safe generalization and the adoption of a general policy, details being left for future experience to test and settle.

Whatever may be true of the value of the information and experience now available, the views presented in this paper are expressed with some assurance that they are neither hasty nor visionary.

A concise statement of a few of the fundamental principles involved may not only avoid misunderstanding, but may shed a clear light on the question before us.

- (1) The state has a right to teach any branch of knowledge that will

promote the public welfare. This is the broad proposition on which public education rests. The attempt to draw a line through education, and deny the right of the state to cross it, is illogical and futile. The state has either the right to teach all branches of knowledge or it has no right to teach any branch. There is no middle ground.

(2) The right of the state to teach all knowledge does not necessarily make such instruction its duty. The right to teach is one thing and the obligation to teach is another. The duty of the state in education is limited by its ability. It cannot teach all persons all knowledge, and it is not its duty to attempt it. When the teaching of one kind of knowledge necessarily excludes more important instruction the state is released from obligation to teach such knowledge. If it has not the ability to cover the whole ground, it becomes its duty to give attention to the more important and useful.

(3) The duty of the state to teach is also conditioned by necessity. The state has no monopoly of education. The church, the family, and the individual have also the right to teach, and every human interest may organize and support schools for its promotion and benefit. When needed, instruction is or will be given by other agencies. The state may or may not provide it. Its concern is to see that such necessary instruction is efficiently given.

(4) The primary and imperative duty of the public school is to provide training and to teach knowledge of general application and utility. It recognizes no class distinction, social or industrial, but provides a general education for all classes of youth. It is a *common* school, a school designed to impart a common education—an education open to all and useful to all.

This primary function of the public school is of the highest practical importance and value. Its comprehensive aim is to prepare the child to discharge the duties and meet the obligations of coming manhood, including his relations to the family, society, and the state—relations involving the highest and most important activities of civilized life. In performing this function the public school assumes that every boy that crosses its threshold to receive instruction is to be a man, and that his first and highest need is to have all the elements of manhood within him developed, quickened, and energized. The first element in this elementary training is character, and the second is intelligence—moral and intellectual furnishing and force.

(5) The public school, as above defined, exhausts neither the right nor the duty of the state in education. The state may establish higher institutions and it may organize or encourage special schools to promote important industries or to meet the wants of classes. It has the right to supplement the public school by special schools for technical training.

We are now prepared to ask whether any technical instruction can be provided by the public-school without subverting its primary function,

without sacrificing the more important and imperative for the less important and the incidental.

The elements of technical knowledge which are of general application and utility may clearly be taught in the public school. These may include instruction in industrial or mechanical drawing, the practical applications of geometry, the keeping of accounts, the elements of the physical and natural sciences, modelling in clay, and those elementary mechanical processes which may be made an efficient means of general training. Such instruction is not only the basis of technical training, but is of great value to all youth, whatever may be their future occupations and positions in life. It is useful as a general preparation for *all* pursuits. Time for this instruction may be gained by reducing the time hitherto devoted to several other branches of study. This has been done in many schools without loss, and the adoption of truer ideas and better methods of teaching would make it possible and feasible in all.

The technical instruction above indicated may properly be called *general*, in distinction from that which relates to a particular trade or pursuit, which is *special*. Special technical training involves the use of the tools and other appliances of given trades and occupations. In the mechanic arts it includes what is known as "handicraft"—skill in the use of tools, machinery, and material. Its purpose is not general training, but special preparation for a special pursuit.

Should this special technical instruction be made an integral part of the work of the public school? In the light of the principles above stated, I unhesitatingly answer, *no*. It is not the duty of the public school to teach trades, and an attempt to do this work on an adequate scale would subvert public education from its primary purpose and end in disappointment and failure. The sooner this is understood and accepted the better for both industrial and general education.

Several objections to the teaching of trades in the public school may thus be stated :

(1) It is impossible for the public school to teach a tithe of its pupils the pursuit or occupation by which they are to earn a living. A glance at the list of occupations given in the report of the census of 1870 will satisfy any one that but very few of the three hundred and thirty-eight occupations therein named can be made a part of the public school course. Of the one hundred and seventy-two occupations classed as "manufactures and mechanical and mining industries" not a score can be taught in a school shop, and but few of these can thus be taught with any efficiency. The public school would make a large contract if it should undertake to train its pupils to be bakers, bleachers, dyers, bookbinders, brewers, brick and tile makers, butchers, candle and soap makers, carpet makers, carriage and wagon makers, charcoal burners, cheese makers, cigar makers, confectioners, coopers, trimmers, tanners, photographers, distillers, engineers, gas works employés, glass makers, gold and silver workers, gunsmiths, locksmiths, harness and saddle makers, hat

and cap makers, shoemakers, iron furnace and rolling mill operatives, cotton, woolen, and silk mill operatives, steam boiler and steam engine makers, tobacco factory operatives, upholsterers, wheelwrights, &c. The attempt to teach one-fifth of these and like trades to all youth would exhaust the present resources of the public schools.

(2) The teaching of a few trades to all pupils would crowd these pursuits with workmen and reduce the compensation of skilled labor therein to the wages of common laborers. The turning of the pupils in the public schools of cities and towns into a few channels of industry would glut these occupations and leave many skilled workmen without employment. The training of all the boys to be carpenters and blacksmiths, for example, would be worse than industrial folly. Not a tithe of them could earn a living as hand tool mechanics. Handicraft is fast disappearing, and more and more mechanical work is done by machinery. The coming artisan will be the master of the machine, as has been clearly shown by Professor Thompson, of the Technical School at Worcester, Mass. The teaching of handicraft in the schools would give nine-tenths of the pupils skill which they would never use in after life or use only incidentally.

A reference to the statistics of industry will show that the above statements are not too strong. A recent paper on technical education contains a table of occupation statistics in Massachusetts, showing that about one-fourth of the laboring population of the State are engaged in manufacturing and mechanical industries. It asserts that these three hundred thousand workmen represent skilled labor in productive industry, and the inference is suggested, if not stated, that the skill of these artisans would be greatly increased by a knowledge of mechanical drawing. The census of 1870 shows that less than one-third of these artisans are working in wood and iron, using handicraft skill, and we estimate that not more than fifty thousand, or one-twentieth of the working population of the State, are hand tool mechanics. Would it not be wiser as well as cheaper to train these fifty thousand skilled artisans in well equipped shops and special schools than to make the weak and vain attempt to train half a million mechanics in the public schools to supply several mechanical industries with fifty thousand skilled workmen?

This objection does not apply to the training of pupils in the use of hand tools and simple mechanical processes, when such training is made a means of *general* education—the training of the eye, the hand, the mind, for educational purposes. Such training is not the teaching of trades or handicrafts, but is general technical training, the same as mechanical drawing, and as such has a place in the public school course. The extent of such training will depend on its value as an element of general education.

(3) Another objection to a partial system of industrial training, the teaching of a few trades to a few pupils, is its manifest injustice. The public school can provide such special training only at the expense of

its facilities and appliances for general education. Why should the value of the public school to the great majority of its pupils be lowered to teach trades to a small number of youth? Why should a few pupils be thus taught trades and the great majority of youth be left without technical training?

The question has no satisfactory answer. The workshop cannot be put into the public school without a sacrifice of its efficiency as an agency for general education. Besides, the teaching of hand tool trades to a few pupils in the public schools is mere playing with the great problem of industrial training. Every productive industry needs the assistance of special technical training.

This objection does not apply to the teaching of trades in reformatory schools, orphan asylums, institutions for the blind, the deaf and the dumb, &c. These are special schools for classes of unfortunate youth, and the pupils therein may be taught trades at the public expense on the same principle that they are fed and clothed.

The three objections above stated show that the public school cannot wisely undertake the work of special technical training. To do this it must train all children for their respective future pursuits or it must teach a few pupils chosen pursuits, and the objections to each of these courses seem to us to be conclusive.

A recent report of the school committee of an eastern city contains this statement: "The question of teaching trades in our schools is one of vital importance. If New England would maintain her position as the great industrial centre of the country, she must become to the United States what France is to the rest of Europe, the first in taste, the first in design, the first in skilled workmanship. She must accustom her children from early youth to the use of tools, and give them a thorough training in the mechanic arts."

This has been pronounced "the most important official utterance yet made in this country on the subject of technical education." If the first sentence fully interprets the meaning of the statement as a whole, we give it as our humble opinion that the utterance is the most impracticable educational scheme which has yet received official sanction. We submit that the teaching of trades in the public schools should not be a question in the minds of the intelligent and practical educators of the foremost school city of the country. The maxim that the head and the hand should be trained together is, in one sense, an important educational principle, but as a statement that the public school should teach every pupil to work with his hands while it trains him to think "with his head," it is impracticable and misleading. It may be true that every child of the requisite age should be taught to work while he receives his schooling, but it does not follow that this work should be supplied and directed by the public school. The family has something to do in the training of children, and a considerable portion of child life is still under the parents' control. The public school has hitherto recognized

this fact, and it has wisely not attempted to do everything which industry, religion, and civilization demand in the education of each generation. The public school cannot wisely be made a workshop for the training of apprentices, but it can and should give such general technical training as underlies all industrial pursuits. The special instruction and practice needed to make a coat, shoe a horse, or build a house should be left to the shop, or to some special trade school, properly equipped for this work. The public school has done its part in preparing youth for special pursuits when it has given them an efficient general preparation for all pursuits, and all industrial experience shows that the more fundamental and thorough this general preparation, the more fruitful will be the special training.

What is needed is to supplement the public school with a system of special schools for technical or industrial training. But how are these special schools for industrial training to be organized and supported? The political, social, and industrial conditions of the nations of Europe differ so radically from those of this country that it is not always wise to be guided by European experience in education; but it will be safe to assume that whatever private enterprise has been equal to there it will be equal to here.

As a rule, the higher technical and agricultural schools are there directed and maintained by the government, and many schools of arts and trades receive more or less state and municipal aid. The more strictly industrial schools, especially those which teach industrial arts or trades, are private institutions, supported and directed by individuals, or by the industries interested, or by philanthropic societies. The number of these special schools has increased until nearly every art and industry has its training or trade school.

We see no reason why this experience may not be repeated in this country. The National Government has laid the foundation of at least one industrial school of a high grade in each State, and in accepting this bequest each State has pledged its faith for the maintenance of the institution thus founded. Polytechnic and technical schools but little less comprehensive have been founded by private munificence, and schools of art are springing up in our cities. The conditional offer of State or municipal aid would induce every important productive industry to establish technical or trade schools for the training of skilled workmen.

What is needed to secure a full development of this system of special schools is a popular demand for technical instruction, and this is coming. Experience is demonstrating the practical value of such training, and every important American industry will soon have its technical school, especially if the public school is held to its own legitimate work.

For the complete success of this system of industrial training the requirements of the public school should be so modified as to permit pupils over, say, twelve years of age to devote a part of each day to

labor or to special technical training. I have long held that the interest of both education and industry would be promoted by the adoption of half time courses of study, running parallel with the present full courses and in the same classes. The half time course should contain only the essential and more important branches of study, and the daily programme should be so arranged as to bring the instruction in these branches into a half day — either the forenoon or the afternoon. This arrangement would avoid the organization of separate schools for half time pupils, and their consequent separation from other pupils, and, at the same time, it would afford the advantages of full time schools without loss to those pupils who wish to devote full time to school work. The limits of this paper forbid the giving of details. It must suffice to say that such an adjustment has stood the test of experience in several of the German states. I received the idea from the school system of Bavaria.

Permit me, in conclusion, to deprecate that advocacy of technical education which disparages the industrial value of general education and more than hints that the public school is an industrial failure. If this be true of the public school, it is clear that neither industrial drawing nor instruction in sewing will prove an adequate remedy. But the public school is not an industrial failure. It has been and is the most effective of all agencies for the promotion of American industry. Its training touches both of the prime conditions of productive industry. It awakens desires and incites and impels man to effort; enterprise and wealth are the results. It gives ingenuity to the mind and cunning to the fingers. Thought in the brain of labor is the alchemy of industry, turning everything it touches into gold. Intelligence and character are the two great conservators of wealth. Who can estimate the industrial value of the common schools of New England!

It is not claimed that the public school is doing its full duty in promoting the productive industries of the country. It should give a larger place in its course to general technical instruction; it should be pervaded by a more earnest industrial spirit, and it should do more to cultivate a taste for industrial pursuits and a respect for honest labor. These practical advances are more important than a weak attempt to make artisans.

THE RELATION OF EDUCATION TO INDUSTRY.

Aristocracy has always opposed the education of the people. The aristocracy of Caste asserts that the great majority of mankind are born to serve the few, and, since the less intelligent the servant the more docile the service, it declares that education unfits the children of toil for their lot in life.

The aristocracy of Capital asserts that popular education is a tax on capital. The more intelligent a man is the greater are his wants and the higher must be his wages in order to meet his increased necessities. Ignorant labor has few wants to supply, and hence is content with low wages.

The aristocracy of Culture asserts that the masses are born dullards, and that all attempts to educate them are futile. The few on whom God has bestowed the gift of brains are commissioned to do the world's thinking, and they thus monopolize the right to education. This is the doctrine of the hero-worshiper, Carlyle, and it is asserted more or less clearly by many devotees of culture who have lost all sympathy for the people. It has been faintly echoed by the learned president of Harvard.

These three great aristocracies (the three C's) unite in opposing all efforts to uplift the laborer by the power of education. Schooling, they assert, spoils children for labor: it makes them discontented with their lot, fills them with vain ambitions, makes them idle, &c. These assertions are now more frequently aimed at higher education, and especially at the high school; but they were once urged, with as great earnestness, against the elementary schools of the people. Reading and writing have received many a blow as the dreaded enemy of capital and caste.

The late financial check to the prosperity of the country afforded these aristocracies a coveted opportunity to renew their assault on popular education. The land was filled with idle men seeking employment, and numerous positions which had been open to intelligent young people were closed against them. This condition of affairs made the idleness of the young painfully evident and gave increased plausibility to the oft asserted opinion that popular intelligence is resulting in a growing disinclination among our youth to earn a living by hard work. The schools were assailed as the enemy of industry and labor, and even the ridiculous complaint of Bacon against the schools of the seventeenth century, that they "filled the realm full of indigent, idle, and

wanton people," has been made against the public schools of the United States.

It is freely conceded that the schools may not be doing their full duty in inculcating a respect for labor and a disrespect for idleness, and their instruction and training may not bear as directly as is desirable on industrial pursuits, but they are not responsible for the evils which have seriously afflicted American industry and American society. It is a common trick of logic to connect two contemporaneous phenomena as cause and effect. The moon is thus made responsible for many results in agriculture, and the party that happens to be in power is always held responsible for "hard times."

The observed disinclination to manual labor, and especially to what is called menial service, is largely due to causes outside of our schools, to influences evident in our American life.

The first of these is the influence of slavery, which once permeated the entire country with degrading views of labor. It will take a hundred years to recover from the effects of the old slave code, with its "mud-sill" theory of labor.

Another cause is immigration, which has filled nearly every department of common labor with workmen long subject to caste ideas and resulting social customs. The unpleasant social conditions thus instituted have crowded out intelligent American labor. It was once a common thing in the Northern States for the sons and daughters of persons in good circumstances "to go out to service," and they were treated as the equals socially of other young people. This is now true in American communities where the social condition of the workman has not been degraded by the introduction of caste ideas and distinctions. When domestic service in this country was subjected to social degradation, the American girl turned to the mills and the factories for employment, and when ignorant servile labor took possession of these she turned to the store, the telegraph office, the school room, and other occupations demanding intelligence and granting some social recognition. What the American girl has done, her brother has done. What each has sought is not so much an escape from work as protection from social ostracism. When the broom or the spade is socially tainted, the intelligent American youth will drop it. The only remedy is to remove the social taint from the implements of labor by elevating and ennobling the workman.

Another of these social causes is the growth of aristocratic ideas among the American people, a result largely due to shoddy wealth, with its silly apings of European manners and customs. The woman who was once a hired girl, but has married rich or suddenly amassed a fortune, is most earnest in impressing her children with an idea of their social rank. Aristocratic ideas are permeating American society.

These social influences are antagonized by the spirit of our free institutions. The principles of civil equality largely involve those of social

equality, and it will take the American people a long time to learn to accept the theory that industrial occupations are a proper basis of social distinctions. The present strife between the political ideas which are the common inheritance of Americans and the caste customs of Europe can but have an injurious effect on American industry.

Another cause of the disinclination to do manual labor is the rapid growth of our cities and towns, opening a multitude of employments and bidding for bright and intelligent youth to fill them, thus causing a rush from the farm into the towns and cities which are springing up on every hand as if by magic. How many different employments have thus been created and what a multitude of desirable positions have thus been opened to American youth! Is it any wonder that the intelligent and ambitious have been attracted to them? Doubtless many a good farmer or mechanic has been spoiled to make a poor lawyer or an unsuccessful merchant; but, on the contrary, all the professions and all departments of trade have been enriched and vitalized by contributions of brain power and character from the farm and the shop. The tide is now setting the other way, and the farm and the shop are bidding for intelligence and skill.

Much of the idleness which disgraces and degrades our industrial life is due to inborn laziness. A disinclination to work is no new thing under the sun. It is as old as human nature, and there is no evidence that it is peculiar to the educated and intelligent. On the contrary, the lower the condition of a people the less their inclination to work. In savage tribes the work is done by those who are compelled to toil either by hunger or external force. In half civilized nations the work is chiefly done by the women, who, in all material respects, are slaves. In all conditions of civilization man does not work except from interest or necessity; and so long as human nature remains what it is there will always be persons who prefer to get a living by their wits rather than by hard work.

Intemperance is a fearful recruiter of the army of idlers and tramps. It destroys every year more skilled labor than all the technical schools of Europe produce.

These, and other causes which might be named, are certainly sufficient to account for the unsatisfactory condition of American industry, without charging it to the schools. Schooling may spoil some people, but many more are spoiled for the want of it. It is ignorance, not intelligence, that is degrading American labor and crippling American industry. The public school is the most effective agency in the country for the promotion of industrial progress.

Over against these pet dogmas of aristocracy, before stated, permit me to put a few propositions, which are abundantly sustained by experience.

1. *Education promotes industry and lessens idleness.*—It awakens and multiplies desires, and thus incites effort to secure the means of their

gratification. It thus touches both factors in the great law of wealth. The Indian builds his rude wigwam and fashions his bow and arrow and tomahawk, and with these his wealth and industry cease. Ignorance everywhere clothes itself in rags and lives in hovels, but when man's nature is opened by education his desires clamor at the gateway of every nerve and sense for gratification. The awakened soul has wants as well as the body. Its desires take the wings of the light and fly to the uttermost parts of the earth for satisfaction. They change the rude hut into the neat cottage and fill it with objects which satisfy the wants of the soul as well as the wants of the body. Enter the homes of educated labor in this land and, taking an inventory of the articles therein which minister to taste and culture, contrast the result with what is found, the world over, in the hovels of ignorance. Some idea will thus be obtained of the industrial power of general intelligence. The elevation of a people in intelligence and taste increases their demands for the products of human industry and skill, and at the same time it intensifies human effort and multiplies and varies the forms of industry. Wealth is the child of education.

2. *Education makes labor more skilful and more productive.*—This proposition is based on a wide comparison of intelligent and ignorant labor, and is sustained by such a multitude of observations that it is no longer questioned by any one familiar with the facts. In 1846, Horace Mann, then secretary of the board of education of Massachusetts, opened a correspondence with business men to ascertain the comparative productive value of educated and uneducated labor. The men addressed included manufacturers of all kinds—machinists, engineers, railroad contractors, officers in the army, &c.—men who had the means of determining the productiveness of labor by observing hundreds of persons working side by side, using the same tools and machinery, and working on the same material, and making the same fabrics. In many instances the productiveness of each operative could be weighed by the pound or measured by the yard. The investigation disclosed an astonishing superiority in productive power of the educated laborer as compared with the uneducated. “The hand,” wrote Mr. Mann, “is found to be another hand when guided by an intelligent mind. Processes are performed, not only more rapidly, but better, when faculties which have been exercised in early life furnish their assistance. In great establishments and among large bodies of laborers, where men pass by each other, ascending or descending in their grades of labor, just as easily and certainly as particles of water of different degrees of temperature glide by each other, there it is found to be an almost invariable rule that the educated laborer rises to a higher and higher point in the kinds of labor performed and also in the wages received, while the ignorant sinks like dregs and is always found at the bottom.”

In 1870, the National Commissioner of Education widened Mr. Mann's investigations, addressing his inquiries to business men in all parts of

the country and to a few large employers in Great Britain. The result was a complete confirmation of Mr. Mann's conclusions.

The same lesson has been taught and enforced by the world's exhibitions. In 1851, the Queen of England sent forth a gracious invitation to the nations to send to her proud capital the best products of human skill. The world responded grandly, and the World's Fair at London was the greatest and richest collection of the works of art and artisanship on which the sun had ever shone. The exhibition was divided into nearly one hundred departments; the jurors were appointed, the articles were patiently examined, and at last the verdict was given. Great Britain was awarded the palm of excellence in nearly all the grand departments of the exhibition. The announcement of this result lit up Birmingham, Manchester, Sheffield, and other manufacturing towns with bonfires, and filled England with general joy. She rejoiced in the belief that she was mistress of the industrial world. She saw her sails whitening every sea and heard the increasing hum of her factories and mills.

Sixteen years passed over Europe. Napoleon III, in imitation of Queen Victoria's example, invited the nations to send up to his imperial capital the choicest products of human industry. The world responded even more grandly than before. The Paris Exposition was divided, like its predecessor, into over ninety departments; the jurors were appointed, the articles examined, and the verdict reached. Great Britain had excelled her competitors in but ten of all the departments. The announcement of this verdict produced consternation among the representatives of British industry. They met at the Hôtel du Louvre, and the one absorbing inquiry was, "Why this defeat?" The unexpected news crossed the channel, causing greater alarm than the threatened invasion by Napoleon I. This defeat awakened England to the startling fact that the industrial sceptre was slipping from her hands; and, as a result, she saw her ships rotting in her harbors and the hammer falling from the hand of her starving workmen. The disaster arrested public attention, and a searching and thorough investigation for its cause was made by a Parliamentary commission. The report made to Parliament in 1868 contains the testimony and the conclusion. *Education had won the palm of excellence for her competitors.* The conclusion is forcibly stated in the testimony of Mr. Edward Huth. "The workmen of other countries," he said, "have a far superior education to ours, many of whom have none whatever. Their productions show clearly that there is not a machine working a machine, but that brains sit at the loom and intelligence stands at the spinning wheel."

The discovered cause indicated the remedy, and the report to Parliament was soon followed by the great education bill, which established a general system of elementary education throughout Great Britain. Technical schools have been multiplied, and science has claimed a larger

place in the higher schools and universities. Great Britain has appealed to the schoolmaster to win back her preëminence in industry.

In all the great comparisons of national skill since made, the superiority of educated labor has been attested in a like striking manner. They all show that the day of mere muscle in industry has passed and the day of mind has dawned. Every form of industry now demands the ingenious brain and the cunning fingers of educated labor.

The productive power of education is also seen in the invention of tools and machinery, which has wrought a revolution in nearly every department of labor. Fifty years ago, the father and his sons, with sickle in hand, went into the harvest field and, handful by handful, laid it in sheaves. A thoughtful reaper with aching back asked the question, "Why cannot I give my fingers to my scythe?" The answer was the invention of the old square cornered cradle, with which the harvest hand could cut two acres of grain with less weariness than he had cut a half acre with a sickle. Another thinking workman with aching arm asked, "What is the use of so much timber?" He rounded the corner and invented the "muly" cradle, with which three acres could be cut more easily than two had been cut with the heavy cradle.

The sickle long since disappeared from the homestead farm; the old square cornered cradle, with a single finger left, hangs on a dying peach tree, and the muly cradle is kept only to pick up lodged places. When the harvest waves its golden welcome to the joyous farmer, out from the stable come two fat horses, and, attached to the great reaper, round and round the field they go, leaving it in well bound sheaves. Here is progress in farming, and this is but an illustration of what is taking place in nearly all departments of human industry.

3. *Education improves the condition of the laborer.*—It increases his economy and thrift, improves his physical habits, lessens his tendency to vice and crime, gives him greater social and moral influence, and prepares him for the wiser discharge of all civil duties. Mr. Mann's investigations showed that "individuals who, without the aid of education, would have been condemned to perpetual inferiority of condition and subjected to all the evils of want and poverty, rise to competence and independence by the uplifting power of education." The testimony on this point, collected by Commissioner Eaton, is exceedingly instructive as well as conclusive. A. J. Mundella, M. P., a great manufacturer in the Sheffield district, England, employing from three thousand to four thousand men, replied :

My experience of workmen, on the average, is that the better a man is educated, and the greater the intellectual resources he possesses, the less is he disposed to sensual indulgence and the less is he inclined to any kind of intemperance and excess. * * * I have employed, in various departments of my own business, intelligent workmen earning lower wages than ignorant men employed in coarser branches of the business; and the intelligent man educates his children, lives in a comfortable house and has much refinement and many pleasant surrounding; whereas the ignorant man, with higher wages in some other department of labor, is more addicted to intem-

perance, his wife and children are worse clad and worse cared for, and his home is, in all respects, less comfortable. Perhaps the best illustration of this would be the contrast between a clerk earning 80*l*. a year, who is a gentleman in education, tastes, and surroundings, and an ignorant laborer earning the same sum. In England, intelligent workmen are generally the men who are distinguished for economy and thrift. They take the lead in all useful associations; they are the managers of the mechanics' institutions, the teachers in the Sunday schools, and the founders of coöperative societies.

Mr. S. P. Cummings, secretary of the Massachusetts Grand Lodge of the Order of St. Crispin and chairman of the executive committee of the International Labor Union, said :

Educated workmen live in better houses, have better surroundings, and are, in all respects, superior to those whose education is limited and defective. They are less idle and dissipated than the untaught classes. As regards economy, morality, and social influence, educated laborers are preëminent among their fellows. I may add one general observation, that, while I was foreman of a shoe factory employing forty hands, I always got better work, had less trouble, and, as a general rule, paid better wages to the more intelligent workmen.

Testimony of like character could be multiplied to almost any extent. Nowhere do an educated people clothe themselves in rags or live in hovels, and nowhere on earth do an unschooled and ignorant people do anything else. Place an intelligent people on the barren soil of New England or among the bleak hills of Scotland, and they will surround themselves with comforts and satisfactions.

It is true that an educated workman demands higher wages than an ignorant one, but his work is worth more. If he demands higher wages, he creates more value. Capital is not far sighted when it looks upon the workman as a mere machine. A machine may be set to the task of running another machine, but the result has never been satisfactory. But whatever the selfishness of capital may demand, the highest interests of the laborer are subserved by education. The workman is more than a machine. He is a human being, and his rights as such are as sacred and inviolable as those inherited by the more favored child of fortune. The artisan may be a hewer of wood, but if his life answer its highest purpose he must also be a hewer of wrong. The laborer may be the head and guide of a family, a member of society, a citizen of the state, and out of these relations flow duties of the highest importance. To prepare man to meet the higher obligations of manhood is the highest function of education. The highest result of education is manhood, and the prime element in manhood is character. Integrity and thought are the most practical results of school training.

This leads me to allude to what is called the "over education" of labor—the latest phase of the opposition to popular education. It is now willingly conceded that a very little learning is not a dangerous thing for the laborer, but Capital, Caste, and Culture are greatly concerned lest the common people be spoiled by too much education. They see special danger in the attempt to put facilities for acquiring a higher education within easy reach of the children of toil. The free high school is assailed as the common enemy of both capital and labor.

I have only time to say that this opposition to the high school rests upon the same basis as the former opposition to the common school. A high school education now no more unfits a boy for manual labor than an elementary education did when comparatively few received it. When the great body of laboring men were unschooled, the few who learned to read and write were thus fitted to fill positions demanding intelligence more than muscle, and they were, in a sense, educated out of their former condition. Where all workmen, as in Germany, receive an elementary education, those whose education is carried to a higher point are best fitted for positions demanding intelligence. The menial labor in every community will, as a rule, be performed by those who are the least qualified to fill other positions. When only a few are educated, it will be performed by the unschooled; when all are educated, it will fall to the lot of those who are the least educated. It is impossible to carry the education of the people to so high a point that the great majority will not still represent the less educated. An education that would fit a person for what is called a higher position in an unschooled community might only fit him for the lowest grade of work in an educated community.

Aristocracy may dismiss its fears respecting the future of labor. An educated people have the art of working both with their hands and with their brains, and they may be trusted to take care of themselves. It will be found that, as a rule, education never unfits a boy for manual labor, if it does not fit him for something else. False social ideas are doing the mischief, not schooling. The higher the education of a people the greater are their thrift and enterprise. Idleness is the twin brother of ignorance.

Those of my hearers who visited the Centennial Exhibition at Philadelphia in 1876 will remember the grand display of machinery and mechanical inventions and industries in the great Machinery Hall. Entering the building before nine o'clock in the morning, you found all the machinery motionless and the vast hall silent. Exhibitors and operatives were quietly taking their positions, and here and there was one tightening a band, oiling a bearing, adjusting the parts of a machine or tool, burnishing a polished surface, &c. As the hands of the great clock approached the hour of nine, men glanced at their watches and a hush of expectancy pervaded the place. At last the minute hand pointed to twelve, and a man approached the huge mass of polished metal in the centre and moved a lever, and then another. The ground began to tremble, the huge shaft above to turn, and the motion instantly ran out through shafts, bands, and wheels, and the immense area was filled with the whirl and hum of thousands of the finest machines and tools which human ingenuity had then devised, all doing their marvellous work—planing, turning, drilling, filing, printing, engraving, weaving, spinning, sewing, knitting, embroidering, &c.

The power back of all this wondrous display of motion and deftness was a few pounds of imprisoned steam in the great engine at the centre. What the matchless engine in Machinery Hall was to its myriads of mechanical operations, education is to the multiplying forms of human labor. The public school is the Corliss engine of American industry.



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No. 3-1881.

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OF THE NATIONAL EDUCATIONAL ASSOCIATION AT ITS
MEETING AT NEW YORK, FEBRUARY 8-10, 1891.

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L E T T E R .

DEPARTMENT OF THE INTERIOR,
BUREAU OF EDUCATION,
Washington, June 8, 1881.

SIR: The meeting of the Department of Superintendence of the National Educational Association in New York City last February was characterized, like preceding meetings, by the ability of most of the papers and discussions then presented.

The subjects treated relate to matters of current importance, and, if published, would satisfy the many demands upon this Office for like information.

I therefore recommend the publication of these papers as a circular of information.

Very respectfully, your obedient servant,

JOHN EATON,
Commissioner.

The Hon. the SECRETARY OF THE INTERIOR.

Publication approved.

S. J. KIRKWOOD,
Secretary.
53-54



NATIONAL EDUCATIONAL ASSOCIATION.

DEPARTMENT OF SUPERINTENDENCE.

MEMBERS IN ATTENDANCE.

REPRESENTING STATES.

Hon. B. G. Northrop, secretary of the State board of education of Connecticut, Hartford.

Hon. James P. Slade, State superintendent of public instruction of Illinois, Springfield.

Hon. J. H. Smart, State superintendent of public instruction of Indiana, Indianapolis.

Hon. C. W. Von Coelln, State superintendent of public instruction of Iowa, Des Moines.

Hon. H. C. Speer, State superintendent of public instruction of Kansas, Topeka.

Hon. M. A. Newell, State superintendent of public instruction of Maryland, Baltimore.

Hon. E. A. Hubbard, agent of the State board of education of Massachusetts, Springfield.

Hon. J. W. Patterson, State superintendent of public instruction of New Hampshire, Concord.

Hon. Ellis A. Apgar, State superintendent of public instruction of New Jersey, Trenton.

Hon. Neil Gilmour, State superintendent of public instruction of New York, Albany.

Hon. Daniel F. DeWolf, State commissioner of common schools of Ohio, Columbus.

Hon. J. P. Wickersham, State superintendent of public instruction of Pennsylvania, Harrisburg.

Hon. J. Ormond Wilson, superintendent of schools for the District of Columbia, Washington.

REPRESENTING CITIES.

Hon. Aaron Gove, superintendent of city schools, Denver, Colo.

Hon. H. M. Harrington, superintendent of city schools, Bridgeport, Conn.

Hon. Ariel Parish, superintendent of city schools, New Haven, Conn.

Hon. N. C. Dougherty, superintendent of city schools, Peoria, Ill.

of the war, stood Dickinson and Sumner to confirm and inspirit the hearts of the people. And here, just twenty-one years ago this present month, fresh from the heat of partisan debate in Illinois, stood the rugged form, here were heard the winning, wise, and weighty words of Abraham Lincoln.

But you are not only welcome to this historic hall; you may find a worthy reception to the topmost story of this edifice. From corner stone to flag staff there is not a square foot of space undedicated to the improvement and education of the people.

I congratulate you, Mr. President, on the purpose that brings you together and the happy issues that may be expected from your assembling. You are here to welcome each other, to hear each other, perhaps what is still more delightful, to hear yourselves. The good that may arise from the presentation and discussion of views may be difficult to calculate. You as superintendents are, I suppose, probably with very few exceptions, graduates from the corps of working teachers. If so, you are familiar and long have been with the complaint so frequently in the mouths of teachers, that the public fails to recognize their vocation as a profession, and only grudgingly, if at all, accords it the dignity in speech and nomenclature of which it is worthy. I state the fact of the complaint without argument, but it occurs to me as apropos to this occasion to say that there is an element wanting in the strictly professional character of the teacher's vocation which it may be, in the course of years, within the power of gatherings like this to supply.

Strictly speaking there can be no profession in the absence of a digested and systematic professional literature, and just that the teacher's art is not furnished with; of course I speak not of text books—of the making of these there is truly no end—I mean philosophical treatises on the fundamentals of pedagogy, the philosophy of the mind of youth in distinction to that of the mind of maturity.

How is it with the law? I can select two volumes from my library and hand them to a young man of parts trained to study and say, "Young man, master those two books. You may separate yourself from all human intercourse; you may exclude all other subjects for reading or study. If in two years or five years you can come to me having thoroughly mastered from these books the principles you find asserted and elucidated in them, you are a lawyer." Much will come from experience. The application of principles is the test of success, but grounded in these principles he is equipped for work, and after forty years of work the successful pleader or advocate can point to his two or his twenty thousand volumes which have formed his modes of thought and have been the source of his strength and power, and say, the whole is a perfect and rounded philosophical system, the applications of the principles of natural justice to the infinite vicissitudes of human experience. I will not enlarge on so fascinating a theme; it is so in the other learned professions. Paul and the Apostles, St. Augus-

tine and the fathers, speak from every pulpit; Hippocrates and Galen minister at every bedside. A systematized philosophical professional literature is the source of all strength and power.

I beg leave to suggest that your assembly may, while not intending it even, contribute to so wholesome a result. Literature is an evolution; the fittest survives. Some words here spoken may strike new veins of thought, and your humblest speaker may turn out to be the educational codifier of the future.

Again, Mr. President and gentlemen, I welcome you in the name of the board of education, in the name of the city of New York, in the name of its first citizen, the founder of this edifice.

I beg leave to express the hope that a wise discretion, a faithful suggestiveness, and a sound wisdom may be present in all your deliberations.

Hon. ALBERT P. MARBLE, president of the Department of Superintendence, replied as follows:

On behalf of the Department of Superintendence I thank you for the very kind words of welcome which you have given to this body. The hospitality of the city of New York we all know something about, and from your words we think we shall know considerably more before the week is ended. This association has been in existence nearly a quarter of a century, and its printed reports published each year form something of a literature. There is an inspiration in this noble edifice, devoted from top to bottom to education, and we expect that as we enter upon this meeting we shall feel it. In conversing with a judge of the supreme court, about six months ago, he said to me of the profession to which I have the honor to belong that it was greater than to be a judge of the supreme court, "because you are the men that make the men that make judges." And again I wish to thank you on behalf of the association for the cordial words of welcome which you have given us; and now, ladies and gentlemen, I wish to say a few words to you.

The National Educational Association was organized in 1857. We are therefore hard upon its quarter centennial. The body is composed of persons actively engaged or interested in the work of education. Early in the history of the association there were organized within it departments composed of those members specially interested in one branch of education. These departments have increased in number till we now have one of superintendence, one of normal schools, of elementary instruction, of higher education, of industrial education. There is also a council of education, designed to formulate conclusions to which the discussions of the association may lead. Membership in the general association is a prerequisite for membership in either of these departments. The proceedings of the association and the addresses delivered are printed annually in a volume which is distributed among the members. The proceedings of the several departments are included in these volumes, each of three or four hundred pages.

The Department of Superintendence is one of the oldest of these. I find it first mentioned in 1858. This, then, must be at least its twentieth anniversary. It has heretofore held its winter meetings in the city of Washington. The membership includes State, city, and township superintendents of schools. Superintendents from half, sometimes from three-fourths, of the States of the Union attend these meetings. Such is the body here met. It was through the influence of this department that the Bureau of Education at Washington was established, and General Garfield made a telling speech in the House of Representatives on the passage of the bill creating the Bureau. By means of this Bureau information respecting the public schools and all other kinds of education is disseminated. This department is also the medium by which the latest and the best in educational reforms, especially that which relates to the public schools, is spread abroad; for the interchange of ideas, both in public discussions and in private talk, tends to this result.

The body which this assembly represents, the teachers of the land, are the builders of the future America. Their work is not seen in a day; the results are far-reaching; the conducting of a nation's education should command the highest wisdom. Congress legislates for the present America with but partial reference to the future. Education relates solely to the future. Is there any grander work than this? If the Interior—largely concerned lately about a few Indians—is made a Department of the General Government, how about Education? It may be that the subject ought to be confined in a small bureau; and it may be that it ought not. This department of the Educational Association has never urged more prominence for its affairs. It has chosen to work quietly, as the Bureau at Washington has. But the example of other nations suggests my inquiry. There is no national control of education; it may be that there should never be even the semblance of such control; but as an individual—for this is not said as a representative of the department—I do not see that anybody need to be frightened, if, in some particulars and with proper restrictions, the National Government should act in the matter of public and universal education. Why not? Is it not of interest to each of us whether our fellow citizens, who participate with us in the exercise of sovereignty, are intelligent?

There are many publicists who advocate, in all matters, the fullest exercise of local option. They appeal to Jefferson, who is its great apostle. Let us see what he says about public education; it applies to all grades. In the discussion of "A bill for the more general diffusion of knowledge" before the legislature of Virginia, 1779, he said:

It becomes expedient for promoting the public happiness that those persons whom nature hath endowed with genius and virtue should be rendered, by liberal education, worthy to receive and able to guard the sacred deposit of the rights and liberties of their fellow citizens, and that they should be called to the charge without regard to wealth, birth, or other accidental condition or circumstance. But the indigence of

the greater number, disabling them from so educating at their own expense those of their children whom nature hath fitly formed and disposed to become the useful instruments of the public, it is better that such should be sought for and educated at the common expense of all than that the happiness of all should be confided to the weak or wicked.

There is an awakened interest in this country on the subject. The New South joins us in fraternal contest to obtain for itself the benefits that have flowed from public universal education at the North. In building up a new system they at the South have this advantage of us: there is no old lumber in the way. The Peabody fund has been a stimulus for them, and it will continue to be so. This new interest at the South displays itself in building up; at the North it shows itself in attacks with a view either to reform or to destroy. In either case our critics are our best friends. For no institution, no individual, attains its full strength without a contest. The young eagle learns to fly by being thrown from the cliff; its eye grows strong by gazing on the sun—so they say. The child contends with measles, whooping cough, chicken pox, and what not before he is a man. We never knew the strength of the Government till it was tried. So the public school system must resist attacks, or its friends will not know what it is worth. Accordingly, we say to Mr. Richard Grant White: "Please write us another Common School Failure." We glory in the way the first article was met; we didn't know before how strong the schools stand in the affections of the people. We leave it to the free college from which he was graduated to discipline him; we wait cheerfully the next discharge. Trained in the public schools, it may be said that a man ought to know whether they are a failure, for he has experienced their influence in his own person. But he may not be able to diagnose his own case. Perhaps he does not discriminate among the influences to which he has been exposed. A man of great ability ought to be satisfied. But if he will attack his schools, who knows but he may next find fault with his grandmother?

The awakened interest in education is evidenced by the reformer, numerous varieties of whom make their appearance through the public public prints almost daily. They develop scientifically, as they think. They are active, and enthusiastic, and visionary, and empirical, and alert. Defects they find, of course; they prescribe a remedy; it fails. They try another; it does not cure. They create a revolution; it does not pervade the land. And then, exhausted and discouraged, they bow the head in sackcloth and sit them down in the wilderness of faded hopes and feeble products, which their own morbid imagination has created; and there, like the ancient prophet, the lamenting Jeremiah, they deplore the forlorn state of our Israel! They might save themselves the trouble of these experiments and failures by studying the work of other people. They would see that the race has gone through the experience; and that the individual might profit by his ancestors, and not try to learn it all for himself. It would be amusing if it were

not sad to see how teachers and all concerned in school work are made the subject of adverse criticism. No case of fraud comes up but the blame is laid at their door; no smash-up on a railroad but the defective education in our public schools comes in for a rap; no record of immorality appears but the "godless schools" have to take the blame of it. If an accident happens in a school such as often happens at home the teacher was careless, of course. I cut this from a paper last autumn:

A SCHOOL TEACHER BURNED TO DEATH.

Fannie Knapp, a teacher in one of the Sutton public schools, was fatally burned Monday because one of her pupils threw a lighted match under her dress. The flames spread so rapidly that she was injured beyond recovery before they could be extinguished, and she died in a few hours.

Not much was said about the unfortunate Fannie Knapp. The public was not much concerned about her; she was nothing but a teacher, and she was paid a salary. It turned out later that it was the girl, a pupil, who had died; the teacher exposed her own life in trying to extinguish the flames; that was all. A good deal was said about the unfortunate child, but nothing was made public about the heroism of the teacher! If the accident had happened through any fault of hers how "our schools" would have been berated. No complaint is made of this tendency; the schools can stand it; they will grow better in consequence of it.

In contrast with the critics and the reformers, are those who expect of the public schools the miracle of universal, omnipotent, all pervading, ceaseless activity and influence. If a new mode of ventilation is devised, it must be applied at once to the public schools; every sanitary improvement seeks at once the public schools; every moral reform, temperance, sewing for the multitude, cookery, the society for preventing cruelty to animals, cruelty to children, cruelty to men and women, and everything, and the society to furnish top boots and fur mittens to the people of Borneo—all are no sooner provided with a chairman and secretary than they move at once upon the public schools to inaugurate the new benevolence. They estimate that one-sixth of all the population are in school; a very small contribution from each will aggregate a large sum; each child, when inspired with the new spirit, will be a missionary at home; and the whole community can in this way be moved. Like Sellers, they think "there's millions in it." Every good thing, they think, should be at once introduced into the public schools. The fact is, they can't all be introduced there.

A youthful citizen of a city where this sentiment prevailed full as widely as the Maine law was executed, had imbibed this spirit of the age, and too much of a spirit unfortunately not confined to this or any other age; he reached a conclusion which he announced in front of a saloon, with a slow and gloriously indifferent tone of voice, and with an air of lofty superiority to the ordinary utterances of mankind: "Whiskey's a good thing; it ought to be introduced into the public schools."

There is a class in the community which is possessed with the notion that all the school methods heretofore adopted and practised are wrong. Children must not be condemned to plod away in the old ruts. Let us make it interesting for the little folks. No more of the dull, dry study! No more poring over books. Study nature. Let the child go forth into the fields, beside the brooks, and "list to nature's voice"—all in a highly poetic strain. That is all very good in moderate quantities. But nature alone cannot secure good education; there is work in it, and work means sweat. There is, indeed, one easy road, down hill all the way. And you know where it leads to! The friends we are now describing make teaching almost wholly oral—what the Orientals would call "chin-chin."

There is philosophy, if not modern "methods of education," in the following:

Deer Isle, up near Mount Desert, has plenty of schools for the native children, but all the boys are rushed through the course at an early age and sent to sea, for which they are prepared by a course of navigation. One young chap had a teacher who was fond of natural history but did not know much about mathematics. One day, after she had given him a long dissertation upon a bee that had flown in at the window, the little fellow, who knew he could have at the longest only three months' schooling before going to sea, suddenly exclaimed: "I say, missis, 'scuse me, but I dunno as I care how a humblebee's wings is made; I hain't no time for sech things; I want to know how to cipher!"

Turning, now, from the elementary schools, let us for a moment consider another class of "educators" who aim at a higher state than the ordinary mortal attains. In the classic shades of some ancient university, they pass through all the philosophy of the ancient classics; Greece and Rome they exhaust; they wing their adventurous flight to the prehistoric philosophy of the east; Buddha and Confucius they note in passing; and then they go on to protoplasm, the original germ of things, primordial cells, and the development theory of the physical man; and beyond this they advance to the primordial cells of mind, the essence of the uncreated *ego*, and the great First Cause, the ethereal, idealistic entity, or whatever it is called, the mother, the original matrix of the universe.

With these superior beings, so developed, etherealized, and sublimated, the ordinary affairs of the world dwindle into insignificance; the things that engage common men sink into nothingness. These philosophers affect an "indifference." In their eyes you see the dreamy, far off look which betokens the sage rapt in the contemplation of the great unknowable and the unattainable. They are often unsuited for the business, the pleasures, the achievements of this century and this age. To the question of the training of the young they come clothed in doubts concerning the possibility that the mass of men can ever attain that blissful state to which they have come. They give up as hopeless the attempt to raise the multitude; and so they confine themselves to the problem of opening the eyes of the select few who may attain Nirvana,

the blissful state of Buddha. This state, which they have reached, is thus set forth in the *Light of Asia* by Edwin Arnold, lately published:

Thus "finishing the Path;" free from Earth's cheats;
Released from all the skandhas of the flesh;
Broken from ties—from Upādānas—saved
From whirling on the wheel; aroused and sane
As is a man wakened from hateful dreams.
Until—greater than Kings, than Gods more glad!—
The aching craze to live ends, and life glides—
Lifeless—to nameless quiet, nameless joy,
Blessed Nirvana—sinless, stirless rest—
That change which never changes!

Let the demi-gods rejoice in that state and admit to it the few congenial spirits whom they can find. We want none of it in this country except as a spice, a condiment to mingle in little doses to flavor the body politic.

Another class of our friends seek in the public schools preparation for every trade and occupation in life. They confound the general preparation which we ought to give and can give with that special preparation which comes of long practice in actual affairs. Instead of a geography, they would substitute a plane; for a slate, they put in a hammer. This playing at work is a sham; the boy sees it to be a sham; he becomes a sham. True education is broader than that. Hear what Horace Mann said forty years ago:

Far above and beyond all special qualifications for special pursuits is the importance of forming to usefulness and honor the capacities which are common to all mankind. The endowments that belong to all are of far greater consequence than the peculiarities of any. The practical farmer, the ingenious mechanic, the talented artist, the upright legislator or judge, the accomplished teacher, are only modifications or varieties of the original *man*. The man is the trunk; the occupations and professions are only different qualities of the fruit it yields. The development of the common nature, the cultivation of the germs of intelligence, uprightness, benevolence, truth, that belong to all—these are the principal, the aim, the end; while special preparation for the field or the shop, for the forum or the desk, for the land or the sea, are but incidents.

Standing on this broad foundation, the development of man, the schools will be useful and rest secure. The contiguous territory of all sorts of trades in school is sand. Whoever builds upon it will see his house swept away. And within the proper sphere of public school education there is work enough to do.

Into this great mart, with the products of every land, float the peoples of the whole world. Here, the liberty loving Englishman escapes the restraints of an insular life; the sturdy Scotchman plants his family tree on this soil; the Irishman finds here the freedom denied him at home. Here the mercurial Frenchman and the phlegmatic German mingle, with a product better than either. Spain and Italy, Austria and Turkey, Russia and Sweden, Norway and Denmark, send their quota to make the city cosmopolitan. Asia, Africa, and the islands of the sea

make contribution to a society here, where all peoples, tribes, and tongues meet, and whence issue streams to flow all over the land. This city needs, the country needs, some alembic in which these heterogeneous elements shall be fused into homogeneity; some agent or force that shall transmit all nationalities into American citizens. That alembic is the public schools; that force is education.

Mr. MARBLE then read the announcements for the meetings of the week, and introduced WILLIAM T. HARRIS, LL. D., of St. Louis, who read a paper on "The present aspect of education," the manuscript of which has not been revised in time for this publication.

At the conclusion of this paper the department adjourned to meet the next morning at the hall of the Young Men's Christian Association.

SECOND SESSION — WEDNESDAY MORNING.

NEW YORK, *February 9, 1881.*

The second session was held at 9.30 A. M., in the hall of the Young Men's Christian Association. Mr. MARBLE called the meeting to order, and said that as the secretary and treasurer were absent, the first business would be the election of an officer pro tempore, whose duty would be to report the meeting, collect fees, &c. Mr. H. M. Harrington, of Bridgeport, Conn., was nominated and elected unanimously. Mr. MARBLE then introduced Superintendent Andrew McMillan, of Utica, N. Y.

Mr. McMILLAN said:

In the first place I propose to inquire whether statistics are necessary as aids to our work, and, if they are, then whether they ought to be specific and accurate in all respects, throwing away all estimates and getting down to exact facts; and, in the next place, whether they ought not to be uniform, so that we can make comparisons readily.

He then proceeded to read the following paper:

UNIFORMITY OF SCHOOL STATISTICS.

Statistical facts, however crude in character or limited in extent, have been recognized by all nations as the legitimate foundation for the operations of general government. These were at first collected in the simplest form, being merely an enumeration of the population, chiefly for the purpose of ascertaining the numerical national strength, for the purposes of offensive or defensive military operations; hence, the census of population may be reckoned as the progenitor of all statistical systems.

The establishment of governments brought also the necessity of providing means for their support; hence the imposition of taxes upon the resources, mainly the industries, of the country.

The collection of these revenues necessarily disclosed the social, physical, and intellectual condition of the people, furnishing data on which

plans of government were framed and operated. Thus, in a primitive manner, at a period far remote from the present, was laid the foundation for our present comprehensive system of statistics, to which we are very largely indebted for a fund of general knowledge.

As early as the fourteenth century statistical records were officially made, and of such importance to students of political science were they deemed, that elaborate works descriptive of commerce, population, &c., were compiled, published, and used as text books in the universities of the principal countries of the Old World.

In the sixteenth century valuable works on this subject were published from time to time, and widely circulated, some of them going through several editions.

From these small beginnings originated the system of collated statistical information, upon which all progress, whether scientific, physical, moral, or intellectual, is established and carried forward. Says an eminent writer: "That it is necessary for a government, in order to govern well, to acquire information upon matters affecting the condition and interests of the people, is obvious. Indeed, the civilization of a country may almost be measured by the completeness of its statistics. However rude the government may be, it cannot attempt to make laws without having acquired the means of forming a judgment, however imperfect, as to the matters brought under its consideration. In this sense, statistics may be said to be coeval with legislation." Although the value of statistical information was universally acknowledged, no action seems to have been taken looking to the establishment of an international congress of statisticians until the year 1853. At that period, however, delegates from the various representative governments of the Old World, uniting with our own, met in conference in Brussels for the purpose of effecting harmony and uniformity in the statistical work of nations. Much was accomplished for the object contemplated, which was, to enable each government to make comparisons readily and accurately with the others. The results prove that incalculable benefits have accrued to all from the efforts of this convention.

In our own country rapid advancement has been made in collecting and disseminating statistical information, both by the Government and various societies devoted to the purpose. If in private life an individual would be successful in business, he must at the close of each year know the exact condition of his affairs as compared with that of previous years, that he may thus be enabled to arrange his plans for the future. So, also, must a government annually ascertain the exact condition of all the departments of which it is composed. No legislator is competent to assist in framing the laws of a country without first having made himself familiar with the moral, social, and political condition of the people.

This knowledge can only be obtained by studying statistics relative to the material resources, industries, education, and other topics of his own country and of other nations. Thus only will he be enabled by com-

parison and study to recommend the passage of laws that will tend to the general improvement of his state or country.

In collecting statistics the government of course must take a comprehensive view of the needs of the several departments that unitedly aim at the welfare and prosperity of the country, each department, however, especially desiring to study mainly such matters as pertain to its special work. The agriculturist seeks information in regard to improvements in agricultural implements, the extent of the land under cultivation, its adaptiveness to certain crops. Statistics in regard to the extent and condition of agriculture will virtually control the market in bread-stuffs, not only here, but in foreign countries.

Manufacturing interests are affected by statistical knowledge of supply and demand; knowledge which also forms the basis upon which to extend commerce, build canals, conduct railroads, and found cities. It reaches far into every plan of social and political economy affecting the interests of individuals as well as communities. So in all departments of government is correct statistical information not only desirable, but absolutely indispensable.

In the department of education we may learn much through the regular channel of personal observation in our routine duty, we may experiment with the varied methods of teaching, adopt new plans of discipline, improve and extend the course of study, and by noting mistakes and remedying imperfections bring our respective departments of school work to a condition somewhat commensurate with our high standard; but much more could be accomplished were we able to add to this local knowledge general statistical facts bearing upon the subject, and collected from all parts of the country, which should serve as the basis of comparison and useful deduction. With the ample provision made by government for collecting facts connected with schools, it would seem that we have but to turn to official reports to obtain all desired information. But it is just here we are confronted by an obstacle of no small dimensions, and which so far as I know nowhere else exists in the wide domain of statistical research. I refer to the lack of uniformity in the methods of collecting facts and data pertaining to school work in the different States of the Union.

It is admitted in the outset that special acts adapted to widely diversified districts necessarily involve a large amount of detailed statement. But this detailed work can be so condensed and generalized as to become available for State and national reports. I refer now, however, to the irregular systems of keeping school statistics, which are not only apparently unnecessary, but render reports coming from the several States nearly useless for purposes of useful comparison.

Take, for example, statistics in regard to the legal school age as it exists in the various States. This is of course an arbitrary enactment, made for the purpose of securing an equal distribution of the State school fund among the various districts in just proportion to the school popu-

lation of each. But pecuniarily it can make no difference whether the limits of that age be prescribed as 4 and 21 or 6 and 18 years, since the pro rata will be the same in either case.

In illustration I cannot do better than refer to the last annual report of General Eaton, United States Commissioner of Education.

From this document the legal school age, as reported from 38 States, 6 Territories, 3 Indian reservations, and the District of Columbia, is as follows:

Of 5 it is from 4 to 21.	Of 1 it is from 7 to 18.
Of 8 it is from 5 to 21.	Of 1 it is from 10 to 18.
Of 9 it is from 6 to 21.	Of 1 it is from 5 to 17.
Of 3 it is from 7 to 21.	Of 1 it is from 6 to 17.
Of 2 it is from 4 to 20.	Of 1 it is from 4 to 16.
Of 3 it is from 5 to 20.	Of 2 it is from 6 to 16.
Of 3 it is from 6 to 20.	Of 2 it is from 5 to 15.
Of 2 it is from 5 to 18.	Of 1 it is from 8 to 14.
Of 3 it is from 6 to 18.	

From these data we find that 17 different periods of time are established as legal school age in forty-eight States and districts. For purposes of comparison it will be seen that this report of school population of the United States is not only valueless, but may lead to misapprehension and gross deception, as one or two examples will clearly show. The legal school age in the State of Florida is from 4 to 21 years, being a period of 17 years, while in the State of Texas it is from 8 to 14, or a period of only 6 years. Hence, we find a striking disproportion in these two States of children of school age as compared with the entire population.

Again, the State of New York prescribes the school age as from 5 to 21 years, while the State of Massachusetts limits it to 5 and 15 years. Again, referring to General Eaton's report, I find the school population of the State of New York to be 1,615,256 and the number of pupils enrolled in school to be 1,032,052, showing 583,204 persons of legal school age not attending school during the entire year. In Massachusetts the number of children of school age, according to the same report, was 297,202, and there were enrolled in school 310,181 pupils, being 12,979 more than the entire school population. Judging from this statistical standpoint the inference is clear that illiteracy is much greater in New York than in Massachusetts, which is not true, as the last published United States census report shows that the number of persons above 10 years of age who cannot read is 1 per cent. greater in Massachusetts than in the State of New York. Could the same school age be adopted in all the States, this difficulty and confusion in the comparison of statistics on this point would be avoided, and at the same time they would be just as useful for local purposes.

There is also a great difference in the manner of keeping the financial statistics, not only in the different States, but also in the different dis-

tricts of the same State. This often leads to unintentional injustice, especially in regard to the comparative cost per pupil for a year's tuition, as the comparison is made on the entire amount expended for all school purposes instead of on the current expenses. Tables founded on these reports are often arranged in years when some districts or cities have erected one or more school-houses, while in others no extra expenses have been incurred. Of course the tuition would be much greater in proportion in one case than in the other, as the new school-houses may cost as much in that particular year as the entire contingent expenses. Would it not be wise, therefore, to classify expenses under two general heads, as ordinary or current expenses and extraordinary expenses?

It seems to me there might be more uniformity in the manner of keeping the records of school attendance. In some cases the average attendance is made out at the close of each month, and the yearly average is compiled from these monthly reports; while others make the average for the entire year.

Again, there is a great diversity in obtaining the number belonging, some striking the names of pupils from the roll after an absence of five consecutive days, and others after an absence of ten days, &c. Perhaps this, however, is not of so much consequence, as all manage to get the average attendance on number belonging at about 98 per cent. I believe, however, that this average is not required in State reports, and ought to be stricken from all reports. The whole number enrolled and the average attendance are all that is needed for comparison.

I might go on and point out many other discrepancies in the present manner of keeping school statistics, but enough have doubtless been presented to show that reform is needed in this department of our work.

In closing, I will present for the consideration of this association the following outline for blanks for keeping school statistics sufficiently in detail for general reference, and which can easily be compiled from the more detailed reports that may be required in different localities.

ANNUAL REPORT FOR CITIES OR DISTRICTS.

1. Total population according to the last national or State census, ———.
2. Number of children between the ages of 6 and 16 residing in the ——— at the date of this report, ———.
3. Number of public schools in the ———, ———.
4. Number of private schools in the ———, ———.
5. Number of pupils enrolled in the public schools during the year. Boys, —; girls, —; total, —.
6. Number of pupils enrolled in the private schools during the year. Boys, —; girls, —; total, —.
7. Whole number of days' attendance of pupils in the public schools during the year, —; boys, —; girls, —; total, —.
8. Whole number of days the schools were in session during the year, —.
9. Average daily attendance of pupils in the public schools during the year, found by dividing the whole number of days' attendance by the number of days the schools were in session. Boys, —; girls, —; total, —.

10. Number of teachers employed in the public schools during the year. Male, —; female, —; total, —.

11. Number of teachers licensed by State authorities. Male, —; female, —; total —.

12. Number of teachers licensed by local authorities. Male, —; female, —; total —.

13. Annual salary paid men principals. Maximum, —; minimum, —; average, —.

14. Annual salary paid women principals. Maximum, —; minimum, —; average, —.

15. Annual salary paid men assistants. Maximum, —; minimum, —; average, —.

16. Annual salary paid women assistants. Maximum, —; minimum, —; average, —.

17. Number of volumes in public school libraries, —.

18. Total value of library, —.

19. The number of public school-houses in the — is: Frame, —; brick, —; stone, —; total —.

20. Total number of sittings in all the school-houses, —.

21. Value of school property: $\left\{ \begin{array}{l} \text{houses, —;} \\ \text{sites, —;} \\ \text{furniture, —;} \\ \text{apparatus, —;} \\ \text{total, —.} \end{array} \right.$

FINANCIAL.

Receipts.

1. Amount on hand at date of last report \$
2. Amount received from State fund.....
3. Amount received from local tax
4. Amount received from all other sources.....

Total

Expenditures.

Ordinary expenses:

1. Teachers' wages
2. Supervision
3. Janitors' salaries.....
4. Fuel
5. For ordinary repairs
6. School books
7. All other incidental expenses, such as printing, rent, &c

Total

Extraordinary expenses:

1. For sites
2. For building and purchasing school-houses
3. For extraordinary repairs.....
4. For new furniture and apparatus.....
5. For new library books

Total

Amount on hand at date of this report

Total.....

6. Assessed valuation of the city or district.....

- | | | |
|------------------------------------|---|---------------------|
| 7. Total tax for school purposes : | { | ordinary |
| | { | extraordinary |
| | { | total |
8. Tax per dollar on the assessed valuation of the city, for ordinary expenses ..
9. Tax per dollar on the assessed valuation of the city, for extraordinary expenses.
10. Average expense per capita for year's tuition, based on number enrolled, including incidental or ordinary expenses

The discussion of this subject being laid before the meeting, Mr. STONE, of Springfield, Mass., said that he had listened to the reading of the paper with a great deal of interest, and was glad that other people were bewildered in attempting to compare the school statistics of the different cities. He did not see how this matter could be reached unless by compelling the adoption of a uniform system. He said that the populations of Springfield and Portland were nearly the same, while the school population of Portland was 10,000 and of Springfield only 6,000, owing to the difference in the school age in the two places. He thought that the per cent. or average attendance was often very misleading. He had only a day or two before visited a school where there were only twelve present, forty-four pupils having the measles.

Mr. McMILLAN said he thought the gentleman (Mr. Stone) had misunderstood him; that he had taken very broad grounds. He sympathized very much with Mr. Stone that there was not more uniformity especially in regard to school population.

General EATON said that different localities recognized school periods of different lengths for special reasons. He thought that children should be enumerated by years, from 5 to 21, perhaps, inclusive. Then there would be no difficulty in making comparisons. In 1870 the Bureau of Education had great difficulty in making its tables so as not to be misleading, but now, notwithstanding the differences in the school period in the different States, it was able to present tables of two hundred cities quite safe to study. General Walker has now collected his schedules for the census, and in them is contained the very information that Dr. Stone wants and that all want. He understood that General Walker had asked Congress for an additional appropriation in order to properly compile these schedules. In conclusion, referring to the high school discussion as a great question agitating the public mind to-day, he said that a foreigner coming to this country found the high school in our cities a distinctive American feature, one especially and most closely connected with the large intelligent class upon which the strength and vigor of American institutions especially depend, and added that a suitable method of reporting the facts connected with this grade of instruction is needed, so that it may be properly understood.

Dr. PHILBRICK spoke of the high estimation in which the school statistics of the United States are held in Europe.

Mr. SMART said that there was nothing so uncertain as facts except figures; that facts often lied and figures generally did; and so he thought there could be no subject which could be discussed to more

advantage than this. He said that a certain per cent. would be found enrolled in the public schools, and that Massachusetts was given as 110 per cent. because the children were enumerated from 5 to 15 years of age and admitted after they were 15. He thought that it was very necessary to have the information contained in General Walker's schedules, and moved that a committee of five be appointed by the chair to present this matter to the attention of Congress.

Considerable discussion ensued as to the number on committees and their duties, participated in by Messrs. Wickersham, Eaton, and Philbrick; and the chair (Mr. Marble) then appointed the following committees:

To memorialize Congress: J. H. Smart, Indiana; A. P. Stone, Massachusetts; Aaron Gove, Colorado; D. F. DeWolf, Ohio; M. A. Newell, Maryland.

Committee on the unification of school statistics: J. D. Philbrick, Massachusetts; J. P. Wickersham, Pennsylvania; C. W. von Coelln, Iowa; A. Parish, Connecticut; J. O. Wilson, District of Columbia; James P. Slade, Illinois; W. W. Waterman, Massachusetts; N. C. Dougherty, Illinois; E. A. Hubbard, Massachusetts; Andrew McMillan, New York.

After a recess of five minutes, Mr. MARBLE read invitations for the members of the association to visit a number of schools, and more especially the Normal College of the City of New York.

WEAK PLACES IN OUR SCHOOL SYSTEM.

Mr. MARBLE then called upon Hon. J. P. WICKERSHAM, State superintendent of public instruction of Pennsylvania, who said:

As the president is aware, I have no formal paper to read on this question. All I propose to do is to make a few remarks, pointing out with a friendly spirit such weak places as I have met with in the administration of public education. We have had very severe criticisms of late upon our system of education, from the outside. They do not receive from me any great sympathy, because they are written by persons very little acquainted with the public school system.

A prudent general before beginning a battle rides along the line for the purpose of ascertaining whether there are any weak places that the enemy might take advantage of. We are fighting the great battle of public education, the education of the people, and it has seemed to me that as superintendents it would be very wise for us to look along our line and see if there are not some weak places that an enemy might take advantage of in a close fight, in the close fight which is coming.

I have little sympathy with the recent book by "Gail Hamilton." As she looks at it, our system has too close an organization; the teacher is not free enough to work out his own individuality. These criticisms it seems to me are not well founded. She ought to have remembered that there is a kind of organization that builds up, and does not tear down

or repress; that organization is necessary in every great work; that nothing is accomplished without it; and although here and there this great machine may press heavily upon one or another, yet we must have a machine in education as in everything else, and machines are good things, even in politics, provided they aim at a high purpose. This book, Mr. President, I consider a weak book.

Then we have the criticism of Richard Grant White. Who is Richard Grant White? What does he know about our systems of education? Has he ever attended our educational meetings? What does he know, that he should undertake to pronounce our public school system a failure? What experience has he had that he can speak on this subject? I have no hesitation in pronouncing that paper of his, as published in the *North American Review*, as unworthy of the subject, unworthy of the author, and unworthy of the great *Review* in which it appeared.

He quotes as proof of these failures that the applicants at West Point have not succeeded as well in late as in former years. You and I know that this is not the fact. This has again and again been proven to be untrue.

First of all, I think it a weakness that school boards and school committees do not possess a greater knowledge of the subject of their duties. They are elected by the people in nearly all our school districts, large and small. I know there are a few exceptions. I think it a weakness that they do not possess more special knowledge in reference to the matter intrusted to their hands. These gentlemen are generally men of intelligence. They are good business men. They are lawyers, doctors, clergymen, merchants, farmers, and are generally selected judiciously; and yet their want of special knowledge is a weakness.

As school directors these gentlemen are intrusted everywhere with the duty of providing apparatus and text books. No one but a teacher, and no one but an expert teacher, is prepared to do this. Again, the duty of these gentlemen is to construct a course of study. This is one of the most difficult pedagogical subjects that we have to deal with. Then, too, they are to be the judges of results of teaching, of methods of education, and the selection of teachers, and yet they are not specially fitted for it. The only discovery made at Quincy was that the members of the committee were unfitted to deal with the question of public schools; but this was a discovery of the greatest value, and should be made known everywhere.

Now, Mr. President, I want to point out another weakness, that is, the want of more experts in the work of supervision. We have probably a thousand gentlemen holding the position of superintendent of schools in States, cities, and counties throughout this country. We need a larger number who will devote their lives to the business of supervising schools. The work of supervising schools in this country is not well done, is not thoroughly done. We need a much larger force. Probably no State in this country is better organized than my own. We have ninety-two

superintendents in my State, and they are all commissioned by the department of public instruction, and all work together as one man. But then we have not half as many in the State of Pennsylvania as we need. We must look to it all along the line, that wherever we can we may strengthen it. It is weak in this respect in Ohio and weak in Massachusetts and weak elsewhere. We should strengthen this right arm of the whole system.

Now, Mr. President, let me point out another weakness, which is that the status of the teacher in the United States of America is not very satisfactory. It requires high art to educate a child. It requires far more skill than to chisel out a statue or paint a picture. Yet, the most difficult art in the world, the most difficult of all arts, is to train a child up to be a man, a full grown man. How young the teachers are! How frequently they are changed! We have them about five years, and then they are gone. Their term is short, their salary low, their tenure of office uncertain. We should see to it that the status of the teacher should be more satisfactory. We should multiply our normal schools and make them better. We should increase our teachers' salaries and press forward the whole work of lifting teachers up to a higher professional plane.

I want to call your attention to another weakness, and that is, children are not kept in school long enough. Large numbers leave school at an early age. Many children simply learn the elements of reading, writing, and arithmetic. And should the public school system be held responsible for those that attend the public schools but for a day, or month, or year? You will find in the prisons of the country a large number of those who have been in the schools for a short period; very few who have graduated from high schools. More than half of the inmates of prisons have been at the public schools a short time, but have acquired only the mere elements of knowledge, and therefore the public schools are not to be held responsible for a weakness of that character.

And this leads me to point out only one other weakness, and that is, that we still want a plan by which those that do not go to school can be brought into school. I have not much faith in a compulsory law in this country; that is, by means of fines and punishments. But there must be a way, and we must find a way, to gather these children into some suitable institution. I think perhaps it can be solved in this way: by making it the duty of school boards as much to look after the children out of school as those that are in school. Then give them power to appoint an agent, half constable and half missionary, more missionary than constable, and bring them into the schools. School boards and teachers and good citizens can do much, and, to make their efforts fully effective, there ought to be schools for neglected children in all cities and thickly settled counties.

These weaknesses are of a general character. These are the points at which our system is weak, and which, if we want to win a victory

for education in this country, we must apply the necessary means to strengthen.

Hon. B. G. NORTHRUP, secretary of the State board of education of Connecticut, said :

I will merely give a skeleton of the points I will urge. I think it is a point of great weakness that we have not in Washington a high school. It is necessary, if a high school be maintained in that city, that it should be supported by the National Government.

I think a cardinal weakness is the insufficient qualifications on the part of our teachers. If we can have throughout America well qualified teachers we shall rejoice. When the Bishop of Manchester was in this country, M. Hippeau, of France, was here also. Each made his report to his own government, declaring that in the schools of America the one defect was the lack of thoroughly qualified teachers.

I sympathize thoroughly with what has been said on the point of more competent and thorough supervision. Our schools suffer on account of too frequent rotation in office. It is exceedingly desirable that this business should not be influenced by political motives. This is a great damage to the system. On that point I need not enlarge.

Our friend has set forth the great weakness of non-attendance. It is a startling weakness, and we ought at once to prescribe a remedy. Every trade union is unanimous in enforcing compulsory education. I should deem a journey to the remotest corner of Connecticut amply repaid if it would bring in one child to the school.

I think one other point of great weakness, not in our system, but of teaching, is that developed in Quincy ; that is, they showed there that hitherto the greatest weakness in American schools was in the failure to develop power of expression. Girard used to say : "The mother tongue—the great educator."

Another point is in the dread, in the fear, which American teachers—and, I think sometimes, American superintendents—have of developing the memory. I do not hesitate to say that you cannot develop it too much. I would not advocate memorizing anything that cannot be understood. I *do* advocate the committing to mind of the gems of literature.

Mr. DEWOLF, of Ohio, said that it seemed that they were in the very infancy of knowledge in regard to remedies. How shall the status of the teachers in the country to-day be changed ? How shall the influence of teachers be made to be felt outside the school room ? It seemed to him that it was not enough to recapitulate these weaknesses, but that thought should be given to changing these things in the several States.

Mr. PARISH, of Connecticut, would not pretend to offer a remedy for all the difficulties considered. Good teachers are wanted. Where shall they be obtained ? Where is the power to demand good teachers

and provide the means by which they should be made? Liberal appropriations are wanted for the schools. In his judgment, if one single class of persons of the community could be reached, these weaknesses would be removed, and that class is the parents. Theirs were the children in the schools. They had the most interest in them; not the teacher; not the school committee. The teacher should go to the home and see what the father and mother think of the conduct of the child. If the parents can be reached, there is a beginning made to rectify this whole work.

Mr. SMART, of Indiana, offered the following resolution:

Resolved, That the Superintendents' Department of the National Educational Association, now in session, hereby tenders to the Hon. Thomas R. Cobb, of Indiana, thanks for his effort to secure from Congress adequate appropriations for the support of the public schools of the District of Columbia, and especially for his recent endeavors to secure an additional appropriation for the purpose of erecting a high school building in Washington, thus aiding in making permanent provision in the capital of the country for that most important part of our American common school system, the free public high school.

This resolution was adopted, and the meeting then adjourned, to meet in the same place at 3 P. M.

THIRD SESSION—WEDNESDAY AFTERNOON.

NEW YORK, *February 9*, 1881.

Mr. MARBLE called the meeting to order, and, there being no business to come before it, at once introduced Prof. CHARLES O. THOMPSON, of Worcester, Mass., who read the following paper:

THE CONSERVATION OF PEDAGOGIC ENERGY.

The doctrine of the conservation of energy has given a forward impulse to all the physical sciences. When Joule showed that heat can be measured in units of work, and Tyndall, following Faraday's pregnant suggestions, discerned the law under which heat, light, and electricity are grouped as modes of motion, all thoughtful persons saw that whole continents of truth lay open to exploration. Physicists arose and trimmed their lamps. Mathematicians contrived new algebras for this new service; foot pounds, ohms, and farads speedily became familiar words; innumerable phenomena which had been vagrants for lack of control came trooping into line under the new laws which had been rapidly announced. Even the inner sanctuary of thought has been invaded, and men are accustoming themselves to think of *thinking* as so much molecular change in the substance of the brain. The possible discovery of a physical method of recording thoughts from the molecular activity of the brain cells is no more to be dismissed as an idle vagary than the telephone and photophone were fifty years ago.

It is not remarkable that the brilliancy of the sudden and enormous gains in the scope of the sciences of matter should have obscured the

importance of the sciences of mind. Mankind have always studied first those phenomena which are most remote from themselves, and they have made steady progress towards themselves. Astronomy was a robust science, dwelling in secure round towers, when chemistry was born, and much more is known concerning chemistry than is known about the mind.

To such an extent have men been overpowered by the rush of new discoveries in physics that many have set about applying the methods of physical research to the phenomena of mind. This, of course, was a questionable process; but it is most natural that the quickening of mind produced by physical research should have extended over the whole field of thought, and that men should demand increasing economy in immaterial agencies when they saw the enormous gains in control and economizing of the forces of nature.

Those who think at all are becoming rapidly familiar with the methods by which physical science secures the most economical conversion of one form of energy into another, and are fretful over the results of school work. Without any thought of measuring an immaterial product by material units, it is yet impossible to avoid the effect which a habit of exactness in dealing with one form of energy has upon all thinking upon any other form. If by exact methods great economy has been secured in the conservation of physical energy, a reasonable and just demand is sure to follow for greater economy in the use of every form of energy. It is not difficult to explain the present critical temper of the public mind towards the public school on this principle; and this critical temper is full of omens of good, for criticism is directed, not against the end of the public school, but against the methods by which that end is sought; for, passing by the dreamers who would abolish discipline and have learning consist in an indolent absorption of agreeable information, and the wise men who would recall the mediæval seclusion of the learned, it is true that the masses of the people believe in public schools and sustain them by large appropriations in spite of recognized defects in the management of them. There is not the slightest indication in any quarter of any weakening of the faith of the people of the United States in the common school. Assuming, then, that the schools rest on a sure basis in the popular conviction of their necessity, I propose in this paper to inquire how the pedagogic energy now expended is uselessly dissipated, and how more of it can be converted into a better kind of man and woman.

A few definitions may help us.

Physical energy is the capability of doing work. It is either potential, as in a bent spring, when it can do work but does it not, or actual, when it does it, as in the spring released. The pendulum at the end of its swing has only potential energy; at the middle, only actual. Energy is the result of force. Of force we know nothing, except as it is revealed in energy.

Pedagogic energy is the result of teaching force. Of teaching force we know nothing more than that it is the power of one mind to awaken, keep alive, and direct a desire for knowledge in another mind. It is given in the structure of some minds. It cannot be imparted or acquired. At least there is no way known of doing this. It is an endowment akin in nature to that of the painter or sculptor.

It is often confounded with skill, but it is not skill, for this may be acquired by manipulation, as the skill of the file cutter or die sinker. Like any other similar artistic endowment it can be broadened by knowledge and deepened by training. Thoroughly well informed, discreet, enthusiastic, and conscientious persons can often simulate these traits and act upon other minds in a way much like that of a teacher, as Mr. Holley once won a wager by running an engine on a level track for a mile, without any fire or steam, by filling the boiler with compressed air. But the teaching force is instantly recognized when it is disclosed in pedagogic energy, though it eludes our analysis.

Like every form of energy, a large part of this is now dissipated. The conservation of energy is the conversion of the largest possible amount of it into other forms.

The end in view in a school is to make the most of the best possible teacher by giving his store of pedagogic energy free play upon the minds of his pupils.

All the many forces that are blended in a good school are auxiliary and subordinate to teaching, and are vainly spent without teaching. For example, the enthusiasm of numbers when not directed after it is awakened may result in squint eyed observation, in bad taste in reading, and in illogical reasoning.

Since our inquiries must be confined to the public school, let us put clearly before us the end in view of this school.

It has been urged, of late, that the only duty of this school is to teach children to read, write, spell, and cipher. This is obviously not the chief end of this useful institution. If it were, it could be secured at vastly less than the present cost. But while this may be conceded to be the direct object of public instruction, there is an indirect object of at least equal importance: I mean the formation of those habits of thought, that proper regard for the rights of others which can only be obtained through daily intercourse in the pursuit of a common end, and that habitual obedience to law which are the conditions of good citizenship in a republic, and an enthusiasm for righteousness. The public school exhibits worth as the only ground of distinction; it blends, in the formative training of early years, all those subtle but energetic forces that children from one rank exert upon those of another, and it gives full scope and efficiency to those *leges non scriptæ* which embody and transmit the net result of ages of civilization and enlightenment, so that the expense of teaching the worst scholar examined by Mr. Walton, for instance, would be amply justified, if that scholar should leave school now, by his

enhanced value as a citizen at the age of twenty-one. For the full results of school life are not capable of measurement by an examination in spelling. The commonwealth cares vastly less about this boy's misspelling his words, making hieroglyphs for letters, and hesitating in his reading than about the kind of man he will be when he comes to vote. And while the kind of man he will be depends somewhat upon the joint action of the enthusiasm of many in a common pursuit, the family, the library, the church, and that most subtle power of personal character, it remains true that good teaching is the greatest and most influential force that acts upon him.

How to make the most of good teaching is the simplest form of our inquiry. Inquiring how teaching is squandered, I call your attention first to the lack of logical sequence in the kinds of work assigned to different grades in the graded schools.

Pupils reach the grammar school unable to add, subtract, multiply, and divide with rapidity and absolute accuracy, destitute of ability to observe natural phenomena sharply and to record their observations in clear and exact language, and with poverty stricken vocabularies. The grammar school is obliged, therefore, to leave its proper work and prepare for it. If all this work were done in the lower schools the grammar school could at once teach technical grammar, the science of arithmetic, and the lessons of history. These branches are referred to as those where reform is most needed.

Philosophers have urged again and again the reasons found in the nature of things for recognizing the order of the mind's growth and the faculties which predominate in childhood as the guiding principle in primary instruction, and they have been supported by a mass of testimony from successful and observing teachers; but hundreds of schools are now taught in ignorance or in defiance of these principles at an enormous waste of time and money.

Why should not technical grammar be excluded from all schools below the grammar grade? Why should not oral lessons in some natural history science—any one that the teacher knows or can be induced to learn—be substituted for the book lessons in grammar which are now inflicted on children, and managed so as to achieve and to secure that ease and fluency and accuracy in the use of words which are the essential quality of a good style?

A good deal of time is spent in our Massachusetts schools in reading; yet, those who examine boys for admission to higher institutions, or who guide their studies there, find that very few know how to read. Of course all know the common words and can call them by name; but very few know how to use books as sources of knowledge. Why should not the thorough reading of even one good author be substituted for the reading book in grammar schools, and so the shaping power of a good style be coördinated with other studies? All good teachers will welcome the new departure in library management by which pupils in

the common school are guided by their teachers in the choice of books and in the right and proper use of them.

To specify a practicable case, why should not reading be partly done out of some history of the United States, like Higginson's, and joined with brief exercises in narration, either oral or written? It is not necessary to furnish every pupil with a book. Two or three copies are enough. This exercise might profitably replace fully one-half the current drill in reading books, with the following advantages: The lively interest of the pupils would be excited, additional and most excellent practice in the use of language would be secured, and the *facts* of history would be fixed in the memory without much effort. This would make history teaching in higher grades a much nobler exercise than it is at present. It would also tend to cultivate a taste for good English by bringing the minds of pupils under the influence of a good author in successive lessons; for no better way could be contrived to arrest and paralyze any tendency to such a taste than the exclusive use of reading books, in which the unhappy pupil runs a muck between two rows of authors, who pelt him with prose from one side and poetry from the other.

There are schools where each of these proposed methods is on trial with such abundant good fruitage as to warrant serious attention to them. Why should not the work in arithmetic be courageously confined to acquiring skill, accuracy, and rapidity in simple computations up to the grammar grade? It is a just complaint that boys and girls who have graduated from the grammar or even the high school cannot add and divide with accuracy and promptness. And if any one can state any good reason why more than half the current requisitions in geography should not be abandoned, a large number of parents would be deeply grateful.

Another waste is the useless expenditure of time in teaching drawing, through all the grades, to every pupil. Somewhere, wherever the wisdom of school superintendents determines, this should cease, and those who evince marked aptitude for drawing should be gathered in evening classes for special instruction by an expert teacher.

Another waste is the enormous overloading of the primaries. A good primary teacher can teach thoroughly about thirty pupils; but the rooms in towns and cities where she has less than fifty are the exception rather than the rule. It follows that the pupils pass up without adequate training, the primary work must be done over, and, of course, the inadequacy of preparation increases at every stage.

It is the common judgment of teachers in secondary and grammar schools that they could do substantially all the work now assigned them if the primary work were well and thoroughly done. That it is not so done is not the fault of the primary teachers; at least it cannot be shown to be their fault so long as they are doomed to the tale of bricks without straw.

Nearly all the evils which afflict our public schools can be traced

directly to a root in the primaries, and a reform here means reform everywhere. The great problem of public instruction is how to effect such a reform. If we propose to increase the number of primary schools we are met by the obvious fact that no great increase in the amount of appropriations from the public treasury can be expected. It is at least a striking coincidence which seems to have the cogency of a law that the amount expended per scholar in the public schools does not exceed the rate of taxation per thousand. It sometimes falls below this limit and sometimes exceeds it by a dollar or two; but whenever it exceeds, a retrenchment scene is sure to follow.

It is necessary, then, to do better work with the means now in hand. I think it easy to show that if each primary school that contains more than forty pupils were divided into two equal parts, and each part taught by the same teacher a half day for the same number of days as now, every pupil will be better fitted for the next grade than he is now, and the teachers would not suffer any greater loss of vitality than now. Probably the teachers would gain by the change rather than lose, in spite of the additional hour per day.

The unoccupied half of the pupils could be provided for in two ways: a large part of them would remain preferably at home; but the other part whose parents cannot easily provide for them must be gathered into half time industrial schools. This arrangement would put an end to what is now the gravest evil in the primaries, namely, the conversion of the school room into a place of temporary refuge for children whose parents are unable to care for them. There is no reason why the school should be turned into a day nursery. It is wiser and more simple to deal with the evil than to evade it. The public is bound to care for poor children. Let the school do its work in its own way, and let the best thing be done for those children who ought to be provided for at the public expense. Let us frankly introduce the *crèche* and not hide it under the guise of a primary school.

It will not lead us very far from the point we are now considering to suggest that in every grade of school teaching energy is wasted in proportion as the number of pupils assigned to a teacher exceeds a very low limit. The enthusiasm of large numbers in the pursuit of a common end is a most valuable auxiliary, and cannot be dispensed with; but, when class work begins, a very small number, ideally from ten to fifteen in a class, are all that any teacher can spend himself on without loss of energy. This, at least, seems to be the lesson of experience. The exigencies of the public school seem to fix the minimum limit at thirty. It is very common to hear good superintendents adduce a small number of pupils per teacher as proof of the soundness of his administration. But by far the most striking and instructive example of the advantage of small numbers is the work done at the United States Military Academy, at West Point.

It is most useful to study the results of the course of study in the

United States Military Academy as a problem in education. Boys are received on precisely the same grounds as give them admission to our high schools, are taught for the same number of years in the same essential branches, and emerge accomplished engineers, ready to cope successfully with the severe difficulties of military science; the boys emerge from the high school without readiness for anything except college. The difference is explained when the fact is stated that the teachers at West Point are selected for their known excellence as teachers, and no one ever undertakes to teach more than twelve students at a time. There is no evading the force of these facts.

West Point has done a better and nobler work for education than for arms, but this inspiring achievement in education has been strangely overlooked.

Let me not be understood as urging that West Point can be transplanted into our common schools or that it ought to be exactly imitated; but it cannot be forgotten that the Military Academy has been sustained by large appropriations by the people of this country through all the vicissitudes of party politics, because it has done well and thoroughly its appointed work. It is, in an important sense, a public school. The people, therefore, can be relied on to sustain good work. And the great example of West Point as a success in pedagogy may teach us that training is a higher end than the diffusion of information, and that the methods of instruction which have proved efficient and successful in any school are worthy of careful attention everywhere.

It is impossible to avoid alluding in its turn to the strange neglect of the memory in our public schools. Nothing strikes an American observer of European schools more forcibly than the easy recitation by pupils of extended passages from good authors—an exercise almost unknown among us. In reacting from the danger of overtasking the memory the pendulum has swung to the extreme of neglecting it.

Another waste of teaching force is the substitution of general intelligence for mastery as an end in view. The American boy now aims at knowing something about everything instead of everything about something, so that the number who come to real life with a consciousness of mastery is annually diminishing.

The quick instinct of students of social science detects this quality, and such inquiries as this begin to appear: Who will succeed the poets Longfellow, Lowell, and Holmes? The orators, Phillips, Curtis, Bullock—all men advanced in life? Are “great men” disappearing from politics? The weak answer is sometimes essayed that the average attainments are so high that greatness has become impossible—as if excellence were an absolute instead of a relative quality.

It is time to inquire with great earnestness whether our systems of public instruction have not begotten in us a certain confidence in the educating power of a system, apart from teaching, and whether in the necessary solicitude about school-houses, text books, charts, ventilation,

&c., we have not overlooked the fact that all these things are subsidiary to teaching, and without it are wholly futile.

I have sometimes felt a grave fear, when I have observed the immensity of our new school buildings and our carelessness about the school teacher, that the historian of education a thousand years hence will style this the age of the mound builders.

The words of Professor Weir, in the *North American Review* for January, 1881, deserve serious consideration :

I declare it to be a fact that just as the prevalence of mechanical agencies in manufacture has destroyed all personal skill in handicraft, * * * so do these vast educational machines, when divested of personal sympathies and personal impulses, tend to a like result in developing the mind.

This want of mastery in the graduates from the schools is the grain of wheat in the bushels of chaff about the lack of practical worthiness in them.

How shall we render the course of study more practical? I answer, first, by taking out a good deal of it and securing something like mastery of the rest. A boy who has mastered a few fundamental things is far more likely to become soundly intelligent than one who has been mastered, as most now are, by a good many things. Fewer studies better taught is the remedy for this evil. There are two special cases under this head which deserve notice. The high school is said to unfit boys and girls for practical life. "It is for the good of the commonwealth that, while nature is yet plastic, children should acquire the manual dexterity and the habits of patient, persevering labor which are essential to their happiness and their success."

This is all true, in a sense. It is true in many cases that the high school graduates are fish hooks not bent on to any lines. But all attempts to cure this evil by introducing what are called more practical studies have failed. Book-keeping, laboratories, and cabinets leave the sore unhealed. The mistake lies in this substitution of smatter for knowledge, and if every high school scholar who is not fitting for college should conclude his course by reviewing arithmetic, including all business forms, in the light of all the algebra and geometry he has learned, his geography by the aid of his physics and chemistry, his history of the United States illuminated by all his acquirements in general history and civil polity, and his English grammar and literature in comparison with all other grammars and literatures he has any knowledge of, he would have a little real knowledge—a taste of the joys of mastery.

Thus reflecting upon the common branches which are so vitally bound up with the common concerns and interests of men the light of all the higher knowledge which scholarship can acquire, we shall brighten and clothe with a new attractiveness the labors in which the great majority must spend their lives—

Blessing toil, where toil abounds, with graces more abounding.

The second special case is that of those who, justly dissatisfied with the apparent tendency of the schools to create a distaste for labor, propose to incorporate handicraft in the curriculum.

This measure does not proceed from a just comprehension of the nature of the evil it aims to cure, and will not be successful.

It is sheer weakness to lay to the charge of any school the unwise discontent with plain living, the haste to be rich, the foolish rivalries, and the general desire to secure a livelihood without working for it which are as old as civilization and apparently inseparable from it.

Boys and girls always have sought to win the easier and more agreeable employments. They always will do this. The irreverence of youth, enhanced as it is by the relaxation of family discipline, and their impatience with the slow and toilsome beginnings of all solidly built lives, need to be restrained by patiently showing and illustrating and enforcing the more excellent way of obedience, industry, and method; but it is not a ground for sudden and novel changes in school systems. It is aggravated by the monstrous defects in home training and by the pollution of the atmosphere with filthy literature, but it is somewhat corrected and relieved by the regular sober discipline of the public school. For the only hope of success in this world lies in obedience to law; the only preventive of idleness is a habit of industry founded on an obedient spirit. Otherwise, skill in handicraft is no security against thriftlessness or vice. Every one who is at all familiar with large manufactories knows that one of the constant drawbacks is this: many skilful men, upon whom at critical moments everything depends, are liable to be overcome by appetite, and waste in idleness time which is more precious to employers than to them.

The real practical question is, whether the youth who seek the avenues of trade shall be intelligent and thoughtful citizens, able to bear adversity with courage and prosperity without exultation, or brawling grumblers in hard times and foolish dreamers in good.

Again it is urged that youth would be allured to the mechanic arts by daily familiarity with them in the school room, and those endowed with aptitude for handicraft would be detected by the test and assigned each to his proper calling. This result, if attained, would only prove a good so far as skilled workmen were evoked by it; for there is already a great excess of unskilled labor. But why create new attractions when the old are great and mighty? What assemblage of mechanical processes could be made in any building to affect the imagination or wake a slumbering aptitude which could compete with the exhibition which every town presents? The air is lurid with the smoke of countless furnaces; every stream is worried with dams; the din of machinery on the grandest scale sounds an incessant call; thousands of workmen go as daily messengers between the shop and home, and make familiar in daily speech the marvels of mechanical achievements. No sober and inquisitive youth is denied access to mechanism of unbounded variety

and interest. This spectacle is not limited to a few hours of a crowded school day; night and day are filled alike with its wonders.

Libraries abound in biographies of the great inventors, and every thoughtful boy can feed his imagination with the achievements of Arkwright, Whitney, and Bigelow. This is the real developing school. This face to face communion with men of like sympathies and passions excites the growing boy more than lathes and engines and spindles. In the peaceful fields of mechanical triumphs, not less than on Marathon, the trophies of Miltiades will not permit a single young hero to slumber.

The ranks of skilled labor in ordinary times are never crowded; but a reasonable man will pause before urging a scheme which must end in increasing the number and diminishing the intellectual resources of unskilled mechanics.

Consider again that this demand for a class restriction in public education does not spring from mechanics and manufacturers, but mainly from those who have been able to command whatever education they desired, and it is very much to be feared that the gentlemen who urge this plea of overeducation, and propose manual training as a cure for it, are, perhaps, unconsciously cherishing the illusion of class education in a republican state, and must be challenged to answer Madison's question, "Why should we, here, in the realm of knowledge or in the public provision for the education of all, divide society into classes upon the ever vanishing line of rich and poor?"

And consider that mere manual training will not suffice. It must be allied to machinery to be effective, and the teachers of our public schools will presently find themselves superintendents of machine shops; otherwise the graduate of the school is in danger of turning out a tinker. If you still claim a disciplinary value for the proposed manual training, this will not be denied. Neither will any one claim that every hour spent in school workshops is so much actually subtracted from the result of school training. But it is not, on the other hand, so much added; and it is incumbent upon the reformer to show what the actual gain to society is through handicraft to balance the necessary loss in intellectual training. The average pupil of the public schools now receives, at the public charge, 166 weeks' instruction of 30 hours each, or about 3 years. Is this too much?

This has not been shown, and I do not think it can be. If it be demanded that the public school should cultivate and enforce habits of industry, self restraint, personal independence, and regard for others' rights, or if it be claimed that the public school can be improved, no one will demur. Great improvements are making, and more can be made; but it is one thing to relieve the difficulties of a good and useful institution and another to aggravate those difficulties by increasing, without improving, the labors imposed upon it.

(1) The general intelligence which springs from the State school is as indispensable to a good market for the products of our manufacturing

skill as it is to that skill itself. We export cheap prints only to the ignorant populations of Africa and the South Seas; but only the finest products of our most skilful workmanship can enter England and the continent of Europe. The home market is equally sensitive; and if we want to sell what our skill produces, we must not paralyze the market.

(2) The amount of school time cannot be much increased. Whatever is taken from it for handicraft would be subtracted from the effectiveness of the school in other directions; and the actual amount of instruction which the average child of the working classes receives has already been shown to be too small rather than too great. By introducing handicraft, supposing it feasible on other grounds, we should do a great wrong to the average scholar and a great injury to handicraft. And consider how trifling at best is the amount of real craft a boy could get in a State school. It would vanish like the frosty coating on the iron which, in a winter morning, he carries to his forge. Knowledge of tools he can easily get in his shop after his school is past, and all the easier for a sound school training. But how, or where, or when shall he repair his loss of the things the school should teach him? These precious hours once gone are gone forever.

It is better, then, to pour all possible vigor, intelligence, and hope into the nerve of the arm which is to smite the anvil than to clothe that arm with any momentary gloss of unserviceable dexterity.

(3) The atmosphere of the school-house is unfavorable to handicraft. The sort of workmen and the sort of work by which an artisan is surrounded during his period of training have even a larger share in determining the quality of his skill than the environment of a school in the formation of character. Workmen trained in any well known shop bear the unique inscription of that shop almost as plainly as the fabrics whose excellence gives at once its reputation to the shop and special value to the services of the men. Workmen not infrequently deteriorate when transferred from a better to a poorer shop. The environment of handicraft is a matter of vital importance.

Again, it is essential to success in teaching the industrial arts blended with intellectual training in a school course that the two should be started and carried on with harmony and equal prominence. The school must have but one end, and towards that all its forces must move. Nothing can form any part of the school which does not share its common life and partake of its common advantages. The parts of a good school are like the parallel bars of a compensating pendulum, the contraction of one balancing the expansion of another to give the exactly measured swing of perfect synchronism.

Only a small part of the pupils, under the most favorable circumstances, would take this practice of choice; and it could not be enforced upon all on any principle of equity. No Carthusian vow can be imposed upon the youth of the public school. The result must be the appearance in the school of a caste, which would be instantly fatal.

All manual training in the use of tools given in this unnatural atmosphere would be feeble and ineffective. The inadequacy of the scheme would be detected more quickly by the pupils than by supervisors, and would engender disorder and discontent.

Neither philosophy nor the common sense of the people decides that manual training is necessary for all pupils or essential to the public welfare; therefore the people cannot justly be taxed for the direct support of institutions which benefit only a class.

The first method applies in practice only to reformatory institutions. Beyond that, the state may and should foster by grants all useful institutions, and directly support through annual taxation only those which are essential to its perpetuity and which could not safely be left to private management. These latter are the public schools; and, while the exact line between essentials and non-essentials in public education has not been clearly drawn, yet the term "public schools" is sufficiently clear and distinct for all practical purposes.

We reach the conclusion, then, that the union of handicraft and school must be committed to special schools of technology, founded by private munificence and directed by permanent boards of management.

(4) Time forbids me from enlarging upon the waste of energy caused by inadequate libraries. This want grows less severe each year. Indeed the growth of the free public library as a means of utilizing the intelligence which the schools create is one of the features of our times.

(5) But all that has been said prepares the way for urging as the last form of waste the inadequacy of the preparation of teachers for their work and of proper supervision. The teacher is, after all, the school, and the school the teacher. Without this force all other allied forces slumber like the chemic forces of the plant till quickened by the light. Great attention is given, and too much cannot be given, to the professional education, selection, and supervision of teachers.

But it has already occurred to some that the force of the teacher is not all commuted into knowledge, but that a large part is spent in enthusiasm—the affiance of light and heat. A good teacher can no more fail of enthusiasm than the sun can shine without heat. But the heat of enthusiasm is not to be disjoined from the light of knowledge.

"The public schools are the people's universities," it is said, and we must give them a taste of everything that anybody knows. But the people have a right to knowledge and will not be denied it, and the people will in the end hold those to strict account who, charged with the solemn duty of providing what is best, took counsel of expediency or of fear. The people expect educators to recommend such measures as philosophy dictates, experience approves, and common sense supports.

After the reading of this paper the chairman gave an opportunity to any who might desire to discuss either this subject or the subject of the morning.

Superintendent JONES, of Erie, Pa., thought that the Military Academy at West Point, though a school supported at public expense, had two or three advantages over most public schools: it could compel its pupils to take its course of instruction entire; it dealt with healthy pupils only, and it could eliminate the stupid or vicious from among them; whereas public schools are obliged to instruct children, healthy or sickly, bright or stupid.

School Commissioner KING, of Richmond Co., N. Y., thought that West Point could be abolished and that just as high a grade of officers would come up, and that, too, from the public schools. There should be more competition among line officers. In his opinion if the positions in the Army were thrown open the public schools would furnish officers as good or better than now come from West Point.

Mr. NORTROP said that America had received a full equivalent for every penny expended on West Point, and the idea that any public school could take its place was preposterous and absurd.

J. G. MURPHY, of Fishkill, N. Y., advocated the use of the perceptive faculties. He said that all children should not be treated in the same way; that a school of thirty pupils would have from three to seven different classes of capacity.

Dr. THOMPSON explained that he presented West Point as an institution to be imitated by the public schools from the fact that it had done thoroughly and well the work it had undertaken. Students entered West Point at about the same age that they enter the high school, but much more is accomplished at West Point. Teachers who desire to accumulate teaching force he thought would do well to study West Point.

After a recess of five minutes Dr. FRANKLIN B. HOUGH, chief of the forestry division, Department of Agriculture, Washington, D. C., read the following paper:

OUR SCHOOLS AND OUR FORESTS.

In presenting a subject with this title, the question might be asked by some, "What possible connection can be traced between our schools of learning and the woodlands of the country?"

The Germans term a nursery of young trees a *Baumschule*, a "tree school," and nobody will deny the strong analogy that exists between the early direction imparted to the young scholar in our schools and the young seedling of the nursery bed, both alike receiving in the tender and susceptible period of life's beginning certain tendencies that influence all that follows to the end. This analogy was forcibly expressed by Pope in the familiar lines:

'Tis education forms the common mind,
Just as the twig is bent the tree's inclined;

and imaginative writers have in all ages and in every language found apt opportunities for illustrating the various phases and vicissitudes of

human life by what may be learned from a tree. But dropping these fanciful analogies, which the active mind may follow to infinite extent, we will at once enter upon the more serious consideration of a subject that is beginning to attract the notice of thoughtful men, viz, the rapid diminution of our forest supplies and the means by which the wants of a near future must be supplied.

We assume that no one will deny as facts that the woodlands of this country are being cut down and used or are suffering from waste in a much greater degree than they are being restored by natural growth; that the maintenance of a due proportion of forests is highly important, in fact indispensable to our wants, and that this limit has in many sections of the country been already reached and passed.

We think no one will deny that the clearing off of woodlands causes the springs and streams of a country to diminish and often disappear in summer; that the channels of mountain streams become eroded by torrents when the forest protection is removed; that streams once perennial and nearly uniform become liable to great alterations in volume and to sudden overflow in heavy rains; that the supply of water for cities, for hydraulic power, and for navigation becomes irregular and deficient at seasons of the year when most needed, and that our fields, unshaded from the sun and unsheltered from drying winds, become liable to destructive droughts.

But, besides these secondary effects, we should especially notice the growing scarcity of wood and timber as a material for use and an article of commerce in regions where it was once abundant, and the effect of this upon their prices, which are constantly tending to further increase as these supplies become less.

In view of these facts let us at once proceed to inquire as to the duties of our schools in reference to our forests. This question of forest supplies has for a long period engaged the attention of governments older than ours, and we should be able to profit from their experience, applying such modifications as differences in government and circumstances may suggest in order to adapt them to our own peculiar wants.

We find in Europe that in every principal country upon the continent the woodlands belonging to the government and to local municipalities and public institutions are under the care of a special branch of administration, which not only looks after their management to prevent injury or waste, but has for its especial duty to secure the restoration of forests when cut at full maturity or at appointed times, and this by means which shall most effectually secure the greatest possible benefit that the conditions allow. This management implies the necessity of a well organized corps of agents specially educated to the duties of their profession, and for this preparation there have been established schools of forestry in every country that has a forest administration, and these schools have been provided with full appliances for rendering their operation complete. At these schools of forestry every branch of science that finds applica-

tion in the cultivation and care of woodlands is taught and illustrated by excursions and practical labors in the nurseries and forests connected with the establishment. The attainments of the student are tested upon entering and at leaving, as well as at various stages of his progress, and at the end of his prescribed course he is ready to enter the forest service upon a subordinate grade, from which he may rise by successive steps to more important stations. Finally, having spent his working years in the service, he is entitled to retirement upon a pension; and, if his career has been one of especial merit, honors and distinction are awarded him.

As the course of instruction in these schools is strictly technical, the range of studies extends no further than to include the sciences that concern the forester's profession, including the legislation and jurisprudence of the forest code, the details of official business, and a knowledge of his duties in the transactions that may come before him in the various stations which he may be called upon to hold. The course varies somewhat in different countries, owing to differences in their forest laws, but it is substantially the same so far as depends upon mathematical principles and upon the natural and physical sciences that are taught.

To illustrate the range and extent of the course, we will present a list of the professorships and of the studies taught by each in the Forest Academy at Tharand, in Saxony, one of the oldest in Europe, and therefore one in which we may expect to find the fruits of long experience embodied in the course of instruction now in use.

This school was begun at Zillbach in 1786, was more formally established in 1795, was removed to Tharand in 1811, became a public institution in 1816, and from 1830 to 1870 was a school of agriculture and forestry combined. For the last ten years it has been a school of forestry only, and has an attendance of from fifty to seventy students, almost one-half of whom are foreigners attracted thither by the excellence of opportunities and ambitious to qualify themselves for the position of foresters to large estates or for employment in the forest service, now becoming more common under colonial governments. There is as yet no school of forestry in Great Britain, but much attention is now being given to the conservation of forests in India and other remote British colonies, and the agents aspiring to these appointments must resort to these special schools upon the Continent, whereof Tharand gets a considerable share.

The academy is under the ministry of finance, and its course of instruction extends through two years and a half. The student must show upon entering, besides certain qualifications as to age, means of maintenance, &c., the attainments implied in a full course of study at a Gymnasium or a Realschule, and if he aspires to the Saxon service he must have worked half a year under approved instruction in a forest.

The course is divided among ten instructors, as follows: (1) the director,

who teaches the history and literature of forestry, forest regulation and improvement and police, and leads in certain excursions and practical exercises; (2) a professor of arithmetic, algebra, and geometry, and their applications to forest work and mechanics, accompanied with mathematical exercises; (3) a professor of chemistry and chemical technology, agricultural chemistry, and laboratory work; (4) a professor of physics, mineralogy, and geology, who leads excursions in the application of these studies; (5) a professor of forest cultivation, protection, and administration, hunting, and forest taxation, with practical excursions and exercises; (6) a professor of general and forestal botany and vegetable physiology and microscopy, with exercises and excursions in natural history; (7) a professor of surveying, road making, draining, the calculus, &c., with excursions in surveying and measuring; (8) a professor of general forest industries, forest finances, and an encyclopedic view of agriculture, pasturage, &c.; (9) a professor of zoölogy, and especially of entomology; and (10) a professor of law and forest jurisprudence.

There are connected with the academy a large library, an extensive and valuable cabinet, a forest garden, and a forest district in which all the practical details of regulation and management are going on and with which the student must become personally familiar.

At the French school of forestry, at Nancy, the student must learn something of military discipline and regulations, and in the Russian schools of forestry the military organization is carried still further and pervades the whole forest service.

At Eberswalde, in Prussia, one of the best of forest academies, 2,648 hours are given to instruction, extending through two years and a half, or a little less than five hours a day, of which 840 (about 32 per cent.) are given to the natural sciences, 440 (about 16 per cent.) to mathematics, 980 (about 36 per cent.) to the economical sciences, 180 (about 6 per cent.) to jurisprudence, and 340 (a little over 10 per cent.) to exercises and excursions.

The following is proximately a list of the schools of forestry now existing in Europe:

(1) *Schools of forestry alone.*—In Prussia, one at Eberswalde and one at Münden. In Saxony, one at Tharand. In Saxe-Weimar, one at Eisenach. In Austria, secondary schools at Weisswasser in Bohemia, at Eulenburg in Moravia, and at Lemberg in Galicia; lower schools at Aggsbach in Lower Austria, at Wildalpen in Styria, and at Kreutz in Croatia. In France, one at Nancy and a School of Forest Guards at Bavas. In Italy, one at Vallombrosa. In Spain, one at San Lorenzo del Escorial, near Madrid. In Russia, one at Evois, Finland. In Sweden, one at Stockholm.

(2) *Forest departments in universities and polytechnic schools.*—In Bavaria, at Munich (lately a separate forest academy at Aschaffenburg, which is still in part retained); in Hesse-Darmstadt, at Giessen; in

Baden, at Carlsruhe; in Brunswick, at the Polytechnic Institution; in Switzerland, at Zürich.

(3) *Academies of agriculture and forestry*.—In Austria, at the special high school, at Vienna; in Württemberg, at Hohenheim, with a special course at the university in Tübingen for those aspiring to a place in the administration; in Russia, one near Moscow, one at St. Petersburg, and one at New Alexandria in Poland, with a special school of applied forest industries at Lissano; in Portugal, near Lisbon; in Denmark, at Copenhagen.

(4) *Academies of mining and forestry*.—In Austria-Hungary, one at Schemnitz. Besides these special institutions, about thirty in number, at which the profession of forestry is made a particular object of instruction, there are a multitude of others in which the importance of the subject is recognized and more or less provision is made. Thus, at three of the agricultural schools in France, an agent of the forest administration is detailed for this instruction, precisely as our own Government details officers from the Army for giving military instruction in some of our colleges. There are at least seven schools in Sweden at which a course of one year in forestry is taught, and ten years ago there were thirteen elementary schools of forestry in that country.

A few years after the Crimean war the Turkish government undertook to establish a school of forestry at Constantinople, and one has been founded recently in India, for the purpose of fitting the agents of the government for an intelligent performance of their duties.

Such being the provision made in other countries for supplying an educational want in their public economy, of which they had felt the need and without which they would have suffered an injury, let us next consider how our circumstances compare with theirs and what are our duties in view of the prospect before us.

As for our wants: If we take into estimate the prairies and the plains, as well as the immense clearings in the older States, we shall find, probably, in the whole country, a relatively smaller percentage of woodlands available for us than that of either France or Germany, where the organization of the forest service is the oldest and most complete, and in some of our newer States and Territories relatively much less than the most poorly supplied country in Europe. It is true that our native supplies are very unequally distributed, and that in some regions they are largely in excess of the present local want. In other sections of the country the timber is at present altogether inaccessible by any existing means of transportation, and in others it is so remote that the expense of freight cannot be borne until the present market prices have greatly advanced, and it will be a sad day for those concerned in the wood industries, and for their patrons, when the time shall come that it will be necessary to bring lumber and timber from these distant points.

As already remarked at the beginning of this paper, the use and waste of forest products far exceed the growth, and this disparity is every

year increasing as new demands arise for local use or new markets are opened for exportation. It is therefore among the plainest of certainties that our people must in the near future feel the inconvenience of greatly enhanced prices and among the strongest of probabilities that they will then begin to realize the profits from the growing of timbers. To do this to advantage they will need a certain kind of education that our schools do not now provide, for, although there may doubtless be hereafter a great deal of empirical planting, just as there is of farming, without the planter being able to assign a better reason for his methods than that his neighbors do likewise or that his father did so before him, it is now too late to deny, and it is quite needless to prove, that in tree planting as in every other pursuit in business the man of best education attains the greatest success.

It is within the knowledge of every one that our native forests present great diversity in their timber growth. In one locality we find the maple or the oak; in another, the ash or the elm; in another, the hemlock, or the pine, the chestnut, the cypress, or the walnut, as the prevailing kind; and this difference will always be found due to the favoring conditions of soil or of subsoil, of subjacent rock foundation, of humidity or dryness, or of elevation or aspect that suit the wants of these particular kinds. It may often happen that a species from another region or country may prove even more thrifty and profitable than any that are found growing in a native state, and in planting a prairie region where no timber has grown, at least within the period of our memories or traditions, it is of the very highest importance that these capabilities and preferences be well understood beforehand. If we commit an error in the sowing of a farm crop the failure will not extend beyond the first year, and the farmer deserves no sympathy who will repeat his error in the next. But timber trees are at best of but slow growth, and a lifetime might be lost in waiting to see the unprofitable growth of a tree ill adapted to its place, while a more intelligent choice and management would have brought a revenue to the planter. But what is our need from an educational standpoint and what is demanded of our schools in the interest of the forests? Will any of the foreign systems apply to our wants, or, if not, what modifications do we need to meet the requirements in prospect? Let us see how the circumstances differ.

In every foreign country where systems of forest management exist there are large areas of woodlands belonging to the government and to communes or other local municipalities and to public institutions.

The inhabitants of communes often enjoy rights of common usage, either in the way of fuel and building material, or in the gathering of seeds and fruits or of fresh leaves for feeding or fallen leaves for bedding their stock, or rights of pasturage, or some other privilege which has been secured to them by statute or confirmed by customs stronger than law. The management of common rights presents some of the most difficult problems with which the European forester has to deal. It

forms a branch of special instruction in the schools of forestry, and it often becomes so serious a bar to improvement that these privileges must be bought off, commuted, or exchanged for some equivalent benefit before a reform can be secured.

In many European forests certain kinds of game are reserved for the enjoyment of a privileged class, and their care and protection come within the forester's duties and form a part of his education, even where their presence works an injury to the growth of the timber he is bound to cherish and proves a scourge to the neighboring farmer, who is forbidden under heavy penalties to injure the animals that may be destroying his crops and, it may be, further forbidden to fence his fields if it should hinder pursuit by those who may join in the chase.

In some instances the government in former times reserved the first choice of timber for its navy, and might even take what it needed where most convenient, not sparing the lawn tree or the avenue planted by ancestors, if the caprice or the convenience of officials so decided, and there are still some rights of preference and some restraints upon private usage that may prove burdensome to the landholder. Finally, there are tenures and limitations upon the title to lands that may embarrass or wholly prevent an industry that brings only a remote benefit; as no tenant would ever plant a tree that could only be cut after his lease had expired or make any other improvement that he could never enjoy. Now, our circumstances as regards the ownership and tenure of the land are as follows:

The National Government has indeed some valuable tracts of timber land which it should lose no time in putting under a management tending to secure the greatest benefit to the present and the future; but our States own no land (except as granted for special objects) and it has hitherto been the policy of both the general and the State governments to transfer their lands to the actual settlers as soon as possible. In fact, all the land in the older States and much of it in the newer States and Territories has already become private property under titles that are absolute and unconditional. Fortunately we have no rights of common usage in our woodlands, no rights of preference in their timber, no privileged classes having rights of chase upon the lands of vassals, no game but such as the owner of the land may choose to own or allow, and no hunting but such as he may permit or forbid. Our schools will therefore never have occasion to teach a forest code or the jurisprudence that may arise under it. They need pay no attention to game except as the state may enact laws for its protection in the interest of agriculture or for other common benefit; and until a time shall come when our forests reserved for the supply of the timber market are owned by great corporations, having the stability and capital that give assurance of permanence, there will be no great opportunities for applying plans of *aménagement*¹ that shall govern the future working of a young forest

¹ Technically used in France for the legally regulated cutting of forests.

upon a private estate, until it comes to full maturity, for the use of generations unborn.

The graduate of a European school of forestry would scarcely find use for the education he had acquired beyond his training in the physical and natural sciences and in mathematics were he placed in the most responsible trust that our forest owners could offer; but in these branches the general principles are alike the world over, however codes may vary, and his success with us, as elsewhere, would be in direct proportion as he had learned to apply these principles to the conditions he might find and to appreciate the modifications in management that new circumstances might require.

The education that our country requires in the interest of forestry (and which, from present prospects, our schools will ere long be called upon to supply) will not, in our opinion, be so much of a thorough and exhaustive kind for the special benefit of a few as of a more general and elementary character that shall come within the reach of many. We need first and most of all, not simply in our schools, but throughout our whole country and especially among the rural and agricultural classes, the diffusion of the simplest principles of political economy that teach the importance of our woodlands to the general welfare and the need of the material that they furnish for the supply of our indispensable wants in life—a due appreciation of the incidental benefits which our woodlands secure to agriculture and to the sanitary and industrial interests that depend upon an adequate and duly equalized water supply.

These utilitarian ideas are not in the least degree inconsistent with a due appreciation of the beauties of woodland scenery and the full enjoyment of all that is lovely in rural landscapes and forest shade. The forester looks with pride and pleasure upon the tree or the grove that his hand has planted, and as he watches its growth from year to year he cannot fail to acquire an attachment for the scenes and solitudes of a woodland life.

To realize how much of the imagery of the poets and of beauty in landscape painting depends upon sylvan scenery and rural associations, we need but imagine how blank and dreary would poetry and painting be without them. Whatever tends to cultivate and extend this appreciation of the beautiful in nature is so far in direct advancement of forestry, and it may be proper to here consider some of the means by which this may be done. We know in every phase of life, in every pursuit of business or of pleasure, in every usage of society, how much mankind are influenced by the example of others. In some things we call this tendency to imitation a fashion and in others a custom, and in neither case can any better reason be assigned for the imitation than that it is the practice of others.

We have an interesting example of a widespread and lasting custom of tree planting in English history. There is at present no country in

the world where there is such an abundance of trees planted for ornament as in England. The well kept parks and landscape views presented upon the estates of the nobility and the landed gentry are the pride of their owners and the admiration of travellers. This taste for rural ornament is largely due to the efforts of Sir John Evelyn more than two hundred years ago. This writer was an especial favorite at the court of Charles the Second and, as remarked by a subsequent editor of his writings, "from an early entrance into public life to an extreme old age he considered himself as living only for the benefit of mankind." His best known work, entitled "*Sylva: A Discourse of Forest Trees*," acquired great popularity, as shown from the large and frequent editions that appeared during the author's life, and the permanence of this interest is further proved by the many later editions which have since been issued, almost down to the present time. Under the impulse and advice of Evelyn, the king and the nobility of that day began extensive improvements in planting their estates, and the example thus set became a widespread fashion among landed proprietors throughout the kingdom, which has continued down to the present time. We have evidence of this immediate and effectual impression made by the writings of Evelyn in a dedication to Charles II prefixed to one of the later editions that appeared during the author's life, in which he says: "I need not acquaint Your Majesty how many millions of timber trees, besides infinite others, have been planted and propagated throughout your vast domains at the instigation and by the sole direction of this work, because Your Majesty has been pleased to own it publicly for my encouragement;"¹ and no more striking or beautiful tribute could be paid by a man of genius to one who had worked so lovingly for the good of his fellow man than was that by the elder Disraeli in his *Curiosities of Literature*, in which he says: "And surely while Britain retains her awful situation among the nations of Europe, the *Sylva* of Evelyn will endure with her triumphant oaks. It was a retired philosopher who aroused the genius of a nation, and who, casting a prophetic eye towards the age in which we live, contributed to secure our sovereignty of the seas. The present navy of Great Britain has been constructed with the oaks which the genius of Evelyn planted." There is something, indeed, in a noble park that betokens stability and opulence in the owner, and there can be nothing more flattering to family pride than to point out a grand avenue of majestic trees that an ancestor planted. We need not travel far nor seek long for illustrations of this feeling in our own country, for a man can scarcely plant a tree upon his homestead lawn without ever afterwards looking upon its growth in size and beauty with satisfaction. If an accident happens to it he willingly spends much more than its simple value, if within the possibility of remedy; or if maliciously injured he will resent it as if it were a personal injury.

¹ Disraeli's *Curiosities of Literature*, vol. II, p. 326 (New York, 1871).

It has sometimes been a custom to plant a tree to commemorate an event. It may record the nativity of a child in a family, or the visit of an illustrious guest, or some memorable event in history. Thus in the ancient Dutch city of Albany there are now great trees in the streets coeval with a present or a former inmate of the dwelling opposite and an aged elm that was planted to commemorate the arrival of General Burgoyne as a prisoner of war soon after the surrender of Saratoga. Throughout the length and breadth of our country we have trees planted during the Centennial year; and whenever a historical event is connected with a tree the tree becomes ever after an object of interest while it lives. The Royal Oaks that sheltered Charles the Second, the Charter Oak of Hartford, and the Treaty Tree in Philadelphia were monuments while they lasted and were cherished as relics when they fell. Of similar but more local interest are the class trees on our college grounds and the trees planted on special occasions to commemorate interesting local events.

The promotion of a taste for rural adornment and ornamental planting being an object worthy of our earnest effort, as well from the æsthetic culture and refined enjoyment they secure as from the favorable influence that they exert upon plantations for utility, let us inquire as to the means by which this object of manifold advantages may be best secured.

In our cities and large towns public parks are now very generally recognized as important agencies for the hygienic welfare and personal enjoyment of their inhabitants. The responsibility as to their management is naturally vested in the municipal government, and should be in charge of a special commission, upon whose intelligence and efficiency their success depends. The influence of public parks upon the general welfare should be more fully appreciated, and there are many cities of large and dense population where these improvements have not yet begun. In others, where a beginning has already been made, the need and opportunity of a barren waste, a river bank, a shore, an island, or a point of land within or adjacent to the city limits has not yet been noticed, where a moderate expense might secure a little paradise of beauty and an inviting place of rest. The grounds around public institutions, in rural cemeteries and the like, might often be made more agreeable to the eye if the opportunity for improvement were pointed out and sufficient means allowed. The interest in city parks might often be greatly increased by greater variety of species and by correct labels of their names.

In villages we find greater opportunities for individual action and abundant advantages from a concert of effort which it is the special province of village improvement societies to secure. I am well aware that others present have given much attention to this class of associations, in which the efforts are sometimes not limited to the material welfare of their localities but extend to intellectual improvement and refinement

in social life. They deserve our highest commendation and support, and the educational bearings of these efforts are too obvious to require special notice.

The example of one village becomes the pattern of another; and should emulation arise between neighboring villages, we would not have it checked until each has outdone the other in rural adornment.

From large villages the example tends to imitation in the smaller ones, where, although the means may be less, the opportunities of space may be relatively greater, and from these to private homesteads throughout the land. Although the intellectual and social refinement arising from these customs deserves first mention among their advantages, we may notice that they tend to enhance the value of the property that they adorn. They render a village more desirable for residence and invite the notice of those who, having earned a competence in the cities, are seeking to retire to the quiet shades of rural life, that still present attractions for intellectual enjoyment and the amenities of a refined neighborhood. The farmer who would wish to enhance the market value of his land could not invest more profitably than in trees; and it will be fortunate if he early learns the useful fact that there are corners and waste places in abundance, now unproductive and unfit for other cultivation, that present the most favorable conditions for the growth of forest trees.

The man who has cleared a farm out of the forest seldom or never plants a tree. He has come, from long custom, to look upon trees as an incumbrance to be removed; and whenever his home presents a noticeable amount of sylvan shade it is more likely to be the work of a younger generation, who have no sympathy with his aversion and a better idea of the comforts of home life. Americans have been reproached for having but slight attachment to the homes of their childhood; and this willingness to sell to a stranger the land that a parent has cleared and cultivated, and on which their own early years have been spent, has been ascribed to a certain instability of character and an uneasy desire for change.

There is doubtless a strong affinity between a love of home and of country, and it is true that an attachment to a homestead because of ancestral possession and family associations would greatly tend to increase our national prosperity and happiness. It would lead to substantial investments for permanence and future enjoyment that the transient and speculative owner would never make, and it would tend to the more solid foundation of our public institutions generally. The man who settles temporarily for business and expects to depart when he becomes rich, spends no money upon public libraries and cares nothing for the charitable and educational establishments of the place, provided they do not burden him while he remains. His influence will generally be adverse if these objects require expenses that bring no return during his stay, and he will prefer temporary expedients to per-

manent investments if they but serve to bridge over the time of his sojourn. The solid and substantial foundation of our institutions is laid by those having a permanent interest in the prosperity of the places where they are located. It is this class alone that erects monuments and that leaves evidences that its members have lived for the welfare of those who are to come after them.

It is a point worthy of inquiry as to whether much of this indifference to the home of childhood and to the possessions of ancestors with which Americans have been charged is not due to their bleak and cheerless surroundings.

We cannot doubt that the influence of a pleasant rural homestead and the choice memories of refined associations in early youth are as capable of making as strong an impression upon our native population as in any country whatever, and although in the absence of laws of entail and under the impulse of adventure or motives of interest or the force of circumstances a change of ownership may often happen and the choice and cherished homestead become the property of a stranger, still the chances become less as the attractions are greater, and a motive worthy of earnest and honorable effort is presented in favor of maintenance in the family line.

From this form of education by example, tending to promote a taste for rural planting and the enjoyment of rural scenery, which cannot fail to promote a more general plantation for utility, let us next consider the direct educational appliances that should be supplied in our institutions of learning.

Commencing with our colleges, we almost uniformly find, except in large cities, that they have sufficient land around them to justify a certain amount of planting and often facilities for a first class arboretum. Instead of the plantation of one or a few species, it would be better to group together, in their natural relations, as great a variety of species as the soil and climate would favor—thus affording a ready illustration for comparative study and the means for becoming practically familiar with the characteristic features of each. Of course each species should be correctly labelled with the scientific as well as the popular name and it would be still better if the synonymes and the names in the more important foreign languages could be known. This object lesson would still be but imperfectly learned unless the student were required to know the leading facts concerning the native region, geographical range, uses, and best methods of propagation of each species under observation; and he should be able to point out the characteristic features of each. Our agricultural colleges should be required and the best endowed of our colleges should be induced to establish nurseries for the propagation of trees and for experimental study, and cabinets of wood specimens and wood products, with illustrations of the foliage, the fruit, &c., should be provided.

In teaching the sciences of geology, chemistry, botany, zoölogy in its

various branches, and climatology, their relations to forestry should be clearly defined and their application shown. We have already noticed the prominence that is given in European schools of forestry to practical exercises and excursions under the guidance of teachers, with the view of rendering the student thoroughly familiar with the subject of his studies and qualified to judge and act intelligently when thrown upon his own resources in after life. There can be nothing more rational or effectual in education than this, and in nothing in the whole plan of our system of education has there hitherto been so much neglect. No person should deem himself qualified to teach a science that he cannot illustrate in its applications as they appear in nature or are employed in the industries; and we would most earnestly commend this point to your thoughtful consideration as a deficiency in our system of education that should be supplied. We are aware that chemistry, engineering, and to some extent the natural sciences are thus practically taught, but we would have the method extended to far greater degree than has yet been attempted. Finally, our college classes, before graduation, should enjoy the privilege of some instruction, if only in a course of a dozen lectures, in which the general subject of forestry should be presented. These lectures might include a brief historical outline of the subject; a notice of the codes of administration in various foreign countries; their methods of management in the ordinary course of forest culture and under exceptionally difficult conditions, as for example upon mountains eroded by torrents or upon drifting sands; the various modes of extraction and transportation; forest police; the prevention and control of fires; the means employed for limiting insect ravages and other injuries; the usages of commerce; the economies that apply, and the question of supply and demand.

In this outline of what might be taught in our colleges, excepting the labelled collections of living trees and cabinets and excepting the special lectures upon forestry, I have suggested nothing but what our existing organizations ought to be able to supply, and this without materially adding to the duties already assigned. The application might require some preparation on the part of instructors to familiarize themselves with these duties and some modification in our text books, or, what would be better, a manual specially adapted to this subject that does not as yet exist in our language, but which could be readily supplied.

Descending from our colleges to the academies, a modified form of the course above sketched might be conveniently applied. The labelled plantations of living trees and the cabinets would still find an appropriate place, and in the studies above enumerated, to the extent that they are taught, the applications to forestry might, with equal advantage, be made practically familiar from fresh specimens in the classroom and by occasional excursions in the groves. There is no more profitable mode for cultivating a habit of observation than by requiring the student

to discover and describe the differences that exist between objects that have a general resemblance but which are still unlike. For example, if branches from two species of the maple or the birch, the oak or the walnut, were assigned as a study, the mental effort involved in the exercise would lead the close observer to notice differences in the leaves, the buds, the bark, and the wood that he had never recognized before, however familiar these objects may have been, and the habit of close observation thus called into exercise may prove of infinite service through after life. The formation of private collections in forest botany and forest products might often be encouraged among the students of our academies to great advantage, requiring them at the same time to learn by their own inquiry and research, from whatever source of information they can devise, as much as may be concerning their properties, their value, and their uses. A relish for rural adornment can be in no way so effectually inspired as by example, and if some leisure hours are spent in planting and cultivating trees the knowledge may prove of great service in after life.

From the academies we pass to our public schools, where the extent of instruction must be modified to suit the more elementary course of studies that are taught. In the great cities the opportunities are few, and perhaps little can be done beyond familiarizing the scholar with the subject by cabinet specimens, engraved illustrations, and such instruction as may be incidentally given in the text books used; but in the rural districts the earnest and faithful teacher has abundant opportunities for inspiring a love of nature and of natural scenery, and there should be no school-house without its little plantation around it, which the inmates are taught to cherish and protect. The pupils may be encouraged to undertake the cultivation of ornamental shrubs rather as a privilege than as an obligation, and many impressions alike pleasant and profitable may be planted in the scholar's mind, that, like seed in good soil, may perchance germinate and bear fruit in after years.

As an illustration of the means by which the common schools may be made the agency of imparting correct ideas upon an important subject in rural economy, I will mention the measures adopted in recent years by the French government for the protection of insectivorous birds through the agency of their schools. Wishing to learn how this was done, I applied, some time since, to M. Waddington, then minister of education, who sent with his reply a series of circulars and documents having reference to the subject before us. In his instructions to the prefects of departments, after noticing the injuries caused to agriculture by noxious insects, which have increased to a truly alarming extent in recent years, he says:

The ministers of agriculture and of the interior have called my attention to these sad conditions, of which the principal cause is the disappearance or at least great reduction in the number of insectivorous birds. These birds are the natural guardians of our harvests and the most precious auxiliaries of the farmer; yet they are everywhere

treated as enemies. The cultivator, forgetting the constant services that they render him, sees only the little faults they commit; children pursue them to destruction; they are caught in nets; their nests are broken up; and these useful friends which strangers come to buy for acclimation in foreign lands are gradually disappearing from our fields. Various circulars already have been addressed to the inspectors of academies and numerous notes inserted in the official bulletins of the ministry with a view to stopping this destruction. Notwithstanding this, I deem it my duty to respond to the wishes of my colleagues by calling anew upon the teachers for their concurrence.

I therefore desire you, M. le Préfet, to address instructions to all the teachers of your department, that they take pains to teach their pupils how to distinguish the insects that are injurious from those that are useful to agriculture; and that they encourage them to destroy the former and protect the latter. It is also of first importance that children should be made to understand that it is to the interest of their families that they destroy no birds' nests, and that in doing so they show themselves both reckless and ungrateful. They should also know the penalties of law that they incur by so doing. [The statutes and ordinances forbidding this practice are here cited.]

Teachers should also remind parents of the responsibilities incurred by allowing their children to destroy birds' nests, and that they are themselves liable to a fine for the acts of their minor children in allowing them to commit this act. I will add that in some communes that could be named teachers have conceived the happy thought of organizing among their pupils little societies for the protection of useful animals. These have done good service, and it would give me great pleasure to see their number increased. I attach, sir, the most serious importance to the execution of this circular, the receipt of which you are requested to acknowledge.

Among the other circulars were lists of birds and animals most useful to the farm and garden; statements of prosecutions under the game laws that had been carried to full punishment; examples of the benefits from the abundance of birds and of injuries from their scarcity, and pathetic stories to be read by the children that might well tend to enlist their sympathies in behalf of these feathered allies of the field. The following may be taken as an example of the class of stories thus brought under their notice:

A sportsman was returning from an unsuccessful tramp, when a little bird accidentally crossed his path. With scarce a motive, for it was not a game bird, he discharged his gun, wounding the little creature, which fluttered slowly away. Curiosity led him to follow the trail till it led to the nest where the mother bird was found in a dying condition, and trying to protect its young that were covered with its blood. The thoughtless cruelty of his act so impressed the hunter that he resolved from that moment that he would never kill another bird.

It may be thought that I am wandering from my subject in passing from trees to birds. But really, can we speak of rural scenery and sylvan life without associating them together? In fact, this very subject of the protection of insectivorous birds for the benefit of agriculture presents a strong argument in favor of planting groves and belts of timber between our fields to afford a nesting place and a shelter for them; and the measure we have seen introduced in France from motives of public economy deserves attention in our own rural districts as much as in any other part of the world.

In speaking of what might be done in favor of rural adornment, and incidentally of planting, through the instruction of our schools, it will

at once occur to us that our teachers should themselves be taught; and hence we come to another phase of education that concerns our normal schools. We cannot here expect to do more than impart some general ideas on the subject; but there should at least be provided half a dozen lectures before each graduating class, and something, if no more than a single lecture, should be given at our annual teachers' institutes upon this most important subject.

In conclusion, we would remark that in this question of forest supplies and the incidental benefits of woodlands, now beginning to excite attention, we start with the disadvantage of having to encounter the prejudices of those who have been accustomed to look upon our woodlands, if not too abundant, at least as infinite in amount and in duration. We must undeceive the overconfident, convince the doubtful, and awaken an interest in the indifferent.

If we may borrow from the experience of our clergy, who generally find old sinners hard subjects for conversion, our greatest hope depends upon the impressions that may be made upon the young. This class we find in our schools, and we have the best of opportunities for inspiring in them a love of the beautiful, as well as of the useful, in the life that is opening before them. Although this association of the pleasant and the profitable should be a leading object in every phase of education, we may give prominence to the former without injury to the latter, and feel assured that, when a fondness for any study or pursuit is once established under pleasant and attractive associations, the uses will be discovered, although they may not have been directly pointed out.

If we can induce the young man to plant a grove of trees for the charming contrast of light and shade that it will afford when grown, he will in due time discover, without being told by us, the market value of the timber in the trees that cast these shadows. The planter of a woodland of oaks and pines may enjoy their growth through a lifetime, and his children after him, until they become grand and majestic, yet this will not prevent us from figuring on their value for staves and shingles when they come to maturity and should give place to a new growth. 'Tis true the love of gain is low and sordid as compared with the more refined and honorable motives of life, and we should appeal to this only when the one you would influence will listen to no other. If by means of the latter we can secure the enjoyment that they afford, and at the same time assure the advantages of the former, we shall have reached the highest point to which our education can attain.

Mr. NORTHROP, of Connecticut, spoke of the recent formation of the Association of Middlesex Falls, in Eastern Massachusetts, to lay out one of the finest parks in America. One object of this association would be to organize a school of forestry. He concluded by saying that until schools of forestry were established the principal substitute should be the teaching in the public schools, and that the minds of the scholars

should be imbued with a love of rural improvement, and that the planting of trees should be encouraged.

Mr. DEWOLF, of Ohio, made some remarks upon the question of the morning, How can the status of the teacher be changed? We are taught, he said, to look to the ministerial or clerical professions for certain classes of work, and these professions are expected to lead us. It seemed to him that those in his profession needed to understand that they had relations to society, and that just in proportion as they felt this they would have the same power that other professions possess.

Mr. NORTHROP stated that there were in Connecticut sixty associations for rural improvement, and that he had aided in forming as many more in other States, and in every case he thought the result had shown the wisdom of the organization.

Mr. DEWOLF followed with some remarks on tree planting.

On motion of General Eaton, the department then adjourned to meet in the same hall at 10.30 the next morning, instead of 9.30, that the members might have an opportunity to visit the Normal College.

A complimentary dinner was tendered the department this (Wednesday) evening at Delmonico's.

Hon. William Dowd presided, and short addresses were made by General Eaton, General Webb, Neil Gilmour, J. P. Wickersham, Aaron Gove, M. A. Newell, D. F. DeWolf, Dexter A. Hawkins, John D. Philbrick, Mr. Page, J. H. Smart, Hosea Perkins, and Professor Scott.

FOURTH SESSION—THURSDAY MORNING.

NEW YORK, *February 10, 1881.*

The department having met, the members listened to some remarks by Mrs. MARY H. HUNT, of the Woman's National Christian Temperance Union, who spoke of the evils of intemperance and the importance of training the children in the schools to habits of temperance, from the standpoint of physiology and chemistry.

General EATON then read the following paper:

MUSEUMS ILLUSTRATIVE OF EDUCATION.

This paper is entitled "Museums illustrative of education," by which expression I mean to indicate collections of articles, apparatus, and objects which may illustrate or symbolize the means and methods and processes of human instruction.

The establishment of such collections involves the question of their expense as well as the question of their relation to the principles of pedagogics. The first question naturally will be decided by the value of these museums as ascertained in the consideration of the second.

All theories of education agree in emphasizing the importance of the senses in the cultivation of the intellect. The conditions of infantile life are mainly physical, and show few signs of the mental power of the

adult. The first years of the child are a waking up to its own wants and to the influences which bear in upon it through the avenues of the senses. The mother still stands to it as its next self, supplying its wants, protection, nourishment, and affection, and directly shaping those conditions of the environment which affect or direct development. The mother is first to repress the cry or to awake the smile, yet all parental agencies speedily find their limit, and others must be admitted, but the principles of growth remain the same. The scope of material conditions increases; society, other than parental or family, appears, and the teacher is brought into requisition. His success will be determined by his skill in commanding the attention of his pupil. As a rule, he will find social economies placing him and his pupil or pupils during the hours of instruction apart from the influences of the family and society and the means and opportunities of observation. Aside from himself and his own attainments, the chief instrumentality at his command is the book.

The schools as thus constituted to-day, of teachers, pupils, and books, with all their conditions, have not come by chance, but are a growth, the marks of which can be distinctly seen if we attempt a comparison of them with the schools of a quarter century, a century, or two centuries ago. Take the subject of text books. The homely little horn-book of the old days has expanded and multiplied itself into numerous and various spellers, readers, arithmetics, geographies, and other text books.

The legs of the little pupils do not so often dangle from their seats. The lighting, heating, ventilating of the room, indeed the conditions of the school generally, are more healthful. Something to aid illustration, such as blackboards or charts, adorns the walls. The dunce block is absent, the ferule less common, and the relation between the teacher and pupil is less that of distance or of physical force on one hand and fear and unnatural restraint on the other, but it has become a nearer approach to the relation between the worthy parent and the worthy child.

And yet these advancements of the school on previous decades and centuries are not quite satisfactory. The teacher with genuine power to instruct and train will find a thousand ways to introduce devices, imagery, motives, by which the pupil's attention will be increased, his conceptions made more clear, and the result more nearly satisfactory to the philosophical view. To the close observer these improvements suggest a purpose to discover and realize, if possible, the relation in which the child is first found to parent and surroundings.

In the history of races and of human culture antedating the use of letters, we have the growth of oral traditions. But here and there a man arises with the histrionic power. He can represent and imitate others, and he meets at once a response from those who hear or witness his exhibition. Another is so constituted as to have power on the side of conscience in moralizing, and finds a corresponding response from the

consciences of those around him. Still another has the power of rhythm, and weaves into poetic language and imagery the experiences, the heroic acts of others, or the striking traditions or the solemn precepts of the moralist, and finds perhaps a chorus of voices responding to his measure.

At another point, historically, we find that a great mind, through its various avenues of information and reflection, has advanced its accumulations far beyond its contemporaries, and the possessor of this mind becomes a teacher. If it be Socrates, his pupil is any one who will converse with him; his place of instruction, the wayside, shop, or garden; and the illustrations and the imagery used are drawn from familiar objects and experiences. If it be Plato, he walks with his pupils in the groves of Academe and discourses upon the profoundest subjects of philosophy. If Aristotle, he adds to philosophical discourse, and leads to heroism by reading to Alexander the pages of Homer. If it be Jesus, the Saviour of men, He goes about doing good; His disciples follow Him; He teaches the greatest doctrines of life, drawing His illustrations and imagery from the objects about them and the experiences of their common life.

But with the introduction of letters the increasing record of facts, the advance of knowledge, and the development of science made it both possible and necessary for the learner and the teacher that selections should be made of the subjects to be taught and that the mass of the facts brought into view should be reduced and rendered available for the period of school days.

We need not stop to inquire how religious motives in all great movements have proved supreme.

It is sufficient to note that in the middle ages, when the education which we now have began to take form, the methods of instruction, controlled by the supreme ecclesiastical power, were shaped to the acquisition of knowledge from the book only, and were necessarily of the most abstract character.

We are all aware how little was then known in all departments of natural history or natural sciences. We cannot pause to consider the agitation produced by the researches which have advanced these departments of knowledge. The theory that ecclesiastical ideas then held and formulated were infallible and admitted of no change encountered antagonisms on the part of all who sought to improve the methods of instruction or to enter new fields of learning.

The absurdities and barbarisms of the schoolmasters of three or five centuries ago we pass over. It is our misfortune as educators that we are still largely under the dominion of these abstract methods, though the greatest evils have been encountered not in the application of these abstract methods to adult minds or to minds after they have reached the period of reflection and reason in which the processes of abstraction become natural; the chief misfortune lies in their application to the

period of youth, when the senses perform so large a part in all mental operations.

We are told, as you know, that the brain is often not matured till the child is ten years old. The teacher must take him as he is. He must expect him while a child to act as a child, to learn as a child, to speak as a child.

These difficulties are specially intensified in all efforts to instruct those who are unfortunate either in the loss of sight or hearing or deficient in mental powers—unfortunates whom no one attempted to teach in ancient times and who have only within a very recent period, under the advanced ideas of christian philanthropy and the progress of modern science, been touched by the semi-creative power of education in schools. These teachers have found it possible to succeed only by meeting the issues which I here bring to the attention of educators in general. They have first studied the child and marked the signs of incipient development. They have analyzed the subjects of instruction and the methods in general use, and found how these could be modified to meet and answer the conditions of their pupils. Their triumph is a marvel, and we hold that the teacher of the normal child, normally developed, may improve his methods by a similar process; and in affirming this we do not admit that the book is useless, that our schools are failures, that our teachers are all ignoramuses, that we are all on the wrong track now.

While we do not deny that we may learn from every civilized nation, we believe and affirm that we have teachers, that we have methods, that we have school-houses and appliances and institutions of all grades (except the very highest), that we have systems of education nowhere excelled, and that on the whole our education, as imperfect as it now is, is producing a society better fitted to live a better life on a larger scale and with better results than are found anywhere in the history of the past or under any other form of education.

We are among those who believe in American institutions and that they embody more good for a great people than any other. We are not so blind as to think we have all that is best. We would learn from all others and draw to ourselves by suggestion and appropriation every benefit they can confer. A moment's consideration will bring to mind the line in which to apply to our education the correctives which we are considering. Prof. Joseph Henry was accustomed to express his idea that our education needed a corrective by saying that we should, in the order of instruction, consult the order of the child's development. We must study the child as he is, physically, mentally, morally, in his material and spiritual conditions and surroundings, and seek to comprehend his destiny. As we have seen, those who deal successfully with the development of defective youth come into the most intimate relations to their actual conditions; and by their nice adaptation of methods bridge over blindness or deafness or imbecility, and reach, nourish,

train, and secure growth. Dr. Howe found there was one and only one available medium to the mental powers of Laura Bridgman, the sense of touch or feeling, and we have the marvellous result: Laura is introduced to the world of knowledge common to others. Applying the same principle in the education of those who are sound, who are without any special defect, we should devise methods adapted to the best development of the entire capacity of the child. In not doing this we commit our greatest blunders. In correcting these blunders we must guard against the tendency to fall into greater evils. The so-called object teaching has been offered as a panacea, yet we often visit a school where these object methods are employed and find the development of the child quite as partial and defective as under the old methods. The evidence is positive against any exclusive method. Professor Bain observes:

Young and old alike on seeing a good picture are apt to rest there. Such is the tendency of all representations, sketches, maps, and the rest. The most valuable helps to geography are models, and if these could be multiplied in schools the conceptions of the general forms of countries would be vastly enhanced; while the subsequent lessons of juxtaposition and relative situation would find a groundwork of remarkable cohesiveness.

What we want in our instruction and training, we repeat, is to use in due proportion all the child's capacities for his harmonious development; not to use solely his perception, or reflection, or expression, or memory, or imagination, or reason. At best there will be much in every child which the teacher cannot comprehend, and with forty or fifty pupils to the teacher there is need that all helps should be in his hand. In these perfected schemes the book will ever hold the preëminent place. Indeed, the child who acquires a taste for reading the book and skill in handling it has the clew to all learning, whether he have a teacher or school or not.

But while the wisest endeavors are used to make the book most effective, it can impart only second hand information. It is equally as important that the pupil should be taught how to acquire also knowledge at first hand: to bring his own eyes, his own ears, experiences, observations, to the service of his mind. And yet his memory must be trained alike in its recollective and retentive capacity; he must know how to reason, too, on what he experiences or observes or reads. His imagination must be stimulated and enriched by the power and beauty of fable, parable, poem, song.

Both Socrates and the Great Teacher of Men employed with the greatest skill the power of imagery to reach the heart and direct the conduct through the imagination.

Instead of doing this whole work for the child, which is here urged, we find that one teacher is strong in operating on the sensibilities, another in forcing obedience upon the will, another in arousing conscience, another in quickening the reasoning faculties, another in cultivating the memory, another in inciting reflection, another in developing

expression, another the taste, another the perceptions dependent upon the senses. What we want and are urging is that an education shall comprehend all these.

A grand defect lies not with the purpose and desire of the teacher, but in the lack of possibilities. The teacher in Siam cannot travel with his royal pupil to Siberia to convey to him a correct idea of snow and ice. He must do it through words and imagery. If we cannot have the thing, we must have the most pertinent illustration or image of it. Since we cannot go everywhere for these observations, we must gather and concentrate their illustrations. The past cannot reenact itself for the student of history. As the book aids him in the study of centuries gone, so the museum must bring together specimens of the armor, implements, furniture, architecture, and arts of those historic ages beyond his observation, and arrange and group them in a manner adapted to his information. "Certain it is," as Bacon observes, "that into the deep, fruitful, and operative study of many sciences, especially natural philosophy and physic, books be not the only instrumentals; wherein also the beneficence of men hath not been altogether wanting; for we see spheres, globes, astrolabes, maps, and the like have been provided as appurtenances to astronomy and cosmography as well as books; we see likewise that some places instituted for physic have annexed the commodity of gardens for simples of all sorts, and do likewise command the use of dead bodies for anatomies."

The idea is as old as the Temple of the Muses. We have all read of the museum at Alexandria, established by Ptolemy 284 years before Christ, and of that one founded by the Roman Emperor Claudius. Then we get glimpses of those at Pergamos, Antioch, and Byzantium. In modern civilization the idea has received great enlargement. Years ago Prof. Joseph Henry remarked:

There is scarcely any subject connected with science and education to which more attention is given at the present day than that of collections of objects of nature and art, known under the general denomination of museums. This arises from their growing importance as aids to scientific investigation and instruction. As they are intended to subserve different ends, they are of different characters. There are, on the one hand, large central museums, supported by government appropriations, and on the other, local museums, which are established and sustained by societies and voluntary individual aid.

One of the most interesting forms which museums have assumed in our day is that wherein the collection of articles for the promotion of public information is combined with that very ancient commercial device, the fair. Many cities and countries have organized such exhibitions, notably the World's Fairs of 1851 and 1862 in London, the Universal Expositions of 1867 and 1878 in Paris, the Weltausstellung of 1873 in Vienna, and our Centennial of 1876 at Philadelphia. Each exhibition of this kind has stimulated and inspired the people who beheld it and has left behind it a permanent museum of great value for the future instruction of the public.

Now, while the student of pedagogical theory and practice finds much in these exhibitions and museums which teaches him, it is only at exceptional times and in special places that he can have frequent access to material illustrating the progress, methods, and conditions of his art. Impressed with the fact and bearing of this deficiency, educators have from time to time endeavored to organize collections illustrative of the subjects and methods of instruction.

Comenius, among other valuable works, prepared his *orbis pictus*. He would have the word learned in connection with the thing; thus, in the study of science the scholar must, as far as possible, have the objects themselves before him, and, when this cannot be done, correct drawings or pictures of them. He would have the true order of instruction learned from nature, and emphasizes the employment of the senses.

Later there came Pestalozzi, reviving the same propositions in a modified form: first, he would teach the thing and the word together; second, he considers that the only effective agents through which to acquire the knowledge of things are the senses, chief of which is that of sight; third, the child should study the objects immediately around him; fourth, from this starting point the sphere of knowledge must be extended by the gradual enlargement of observations.

Then came Fröbel, seeking to perfect what these eminent men had already attempted in the application of nature's method in the education of the child.

It should be recollected that during the progress of these changes in theory and practice the subjects of instruction were multiplied. Botany, mineralogy, zoölogy, chemistry, physics, and astronomy made great advances. Each engaged the attention of master minds. Experiments and illustrations in the presence of the pupil increased, and by degrees he was encouraged to attempt manipulation for himself. Under the old classical curriculum the library was the chief aid required in instruction, but now cabinets of minerals and of botany were introduced, and in time collections of specimens illustrative of all the physical sciences.

Dr. De Cuyper, a distinguished professor at the University of Liège, says, in his report on polytechnic and higher industrial schools in Germany, that the success of these schools is to be ascribed to the educational auxiliaries which the student finds in the varied and complete collections connected with the schools. These collections educate both the professor and the student. The famous Royal Industrial School at Berlin (Dr. Reuleaux's) has at present 16 distinct collections; the Mining Academy at Freiberg has 11; the Polytechnic School at Munich, 27; the Polytechnic School at Carlsruhe, 12; the Polytechnic School at Darmstadt, 15; and the Polytechnic School at Brunswick, 14.

In 1877 the Saxon ministry of public instruction thought it of sufficient importance to issue a special circular calling attention to the excellent papier mâché and other models prepared for the use of schools by the Museum Salvator at Dresden.

The increased use of illustrations in science and physics affected the methods of teaching the classics and mathematics. The professor of Greek and Latin now adorns his room with maps, plane and raised, or the localities mentioned in the text, with typical representations of architecture, and with the busts of the celebrated persons mentioned. The change is no less in the methods of teaching mathematics. Says Herschel :

Number we cannot help regarding as an abstraction, and consequently its general properties or its axioms to be of necessity inductively concluded from the consideration of particular cases. And surely this is the way in which children do acquire their knowledge of number, and in which they learn its axioms. The apples and the marbles are put in requisition, and through the multitude of gingerbread nuts their ideas acquire clearness, precision, and generality.

Says Mr. John Stuart Mill:

The fundamental truths of the science of number all rest upon the evidence of sense; they are proved by showing to our eyes and to our fingers that any given number of objects, ten balls, for example, may by separation and rearrangement exhibit all the different sets of numbers the sum of which is equal to ten. All the improved methods of teaching arithmetic to children proceed upon a knowledge of this fact. All who wish to carry the child's mind along with them in learning arithmetic—all who (as Dr. Biber in his remarkable letters on education expresses it) wish to teach numbers and not mere ciphers—now teach it through the evidence of the senses, in the manner we have described.

Mr. Spencer observes, quoting Mr. Wyse:

A child has been in the habit of using cubes for arithmetic; let him use them also for the elements of geometry. I would begin with solids, the reverse of the usual plan. It saves all the difficulty of absurd definitions and bad explanations on points, lines, and surfaces, which are nothing but abstractions.

Huxley says:

But if scientific training is to yield its most eminent results, it must, I repeat, be made practical. That is to say, in explaining to a child the general phenomena of nature, you must, as far as possible, give reality to your teaching by object lessons; in teaching him botany, he must handle the plants and dissect the flowers for himself; in teaching him physics and chemistry, you must not be solicitous to fill him with information, but you must be careful that what he learns he knows of his own knowledge. Don't be satisfied with telling him that a magnet attracts iron. Let him see that it does; let him feel the pull of the one upon the other for himself. And, especially, tell him that it is his duty to doubt until he is compelled, by the absolute authority of nature, to believe that which is written in books. Pursue this discipline carefully and conscientiously, and you may make sure that, however scanty may be the measure of information which you have poured into the boy's mind, you have created an intellectual habit of priceless value in practical life.

Combe remarked in general:

The true plan is to present the object to the children. Let them examine its form, size, color, and other particulars, and afterwards tell the name, and spell it. All nature is adapted in the most beautiful manner to the faculties, and the study of nature imparts great pleasure. Thus the curiosity of children to know things is insatiable. You are aware that they will break their playthings to see what is within. When properly taught, the elements of all the sciences are simple. Talk to a child of geometry, triangles, and hexagons, and you will puzzle it completely. But present a figure, let it notice that it has three sides and three corners, then tell it that all such

figures are triangles, and it readily understands the matter. So of the other geometrical figures. Children always take pleasure in learning by actual presentation. They can be instructed in almost anything which can be presented to them directly and subjected to their senses.

Herbert Spencer affirms also as a general principle:

The rudimentary facts of exact science are now being learnt by direct intuition, as textures and tastes and colors are learnt. Employing the ball frame for first lessons in arithmetic exemplifies this. It is well illustrated, too, in Professor De Morgan's mode of explaining the decimal notation. M. Marcel, rightly repudiating the old system of tables, teaches weights and measures by referring to the actual yard and foot, pound and ounce, gallon and quart, and lets the discovery of their relationships be experimental. The use of geographical models and models of the regular bodies, &c., as introductory to geography and geometry respectively, are facts of the same class. Manifestly a common trait of these methods is that they carry each child's mind through a process like that which the mind of humanity at large has gone through. The truths of number, of form, of relationship in position, were all originally drawn from objects; and to present the truths to the child in the concrete is to learn them as the race learned them. By and by, perhaps, it will be seen that he cannot possibly learn them in any other way; for that if he is made to repeat them as abstractions, the abstractions can have no meaning for him, until he finds that they are simply statements of what he intuitively discerns.

If, after considering the opinions of such eminent authorities, there be any who deny that the changes here urged are improvements, it will be in vain to present to their attention further arguments. Educators generally have accepted or are accepting these principles, but from what has already been said it is evident that when they speak of the museum illustrative of education they mean something quite different from the cabinet or apparatus by which the teacher of science or mathematics points his lesson. The several subjects of instruction will indeed find here their appropriate illustration; but, passing beyond these, such museums will contain all material which can, to the eye of the teacher, the parent, and the administrator, convey information respecting the relations of education to man, to industry, to art, to science, yes, to civilization. Such a collection will be to normal training what a natural history museum is to instruction in science, what an herbarium is to botany. Here the teacher, the superintendent, the school-house builder, the maker of school furniture, the sanitarian, the sociologist, should find material for thought and information.

Statesmen and students of history here find in the use or neglect of these methods the secrets of the greater or less progress of nations.

The protest against abstract methods in the training of early childhood and the effort to make more complete aids and illustrations have made rapid strides within the last fifty years. Already we have information of sixteen museums in Europe specially illustrative of education. These are located at Vienna, Buda-Pesth, St. Petersburg, Amsterdam, Rotterdam, Brussels, Paris, Berlin, Rome, Palermo, London, Munich, Dresden, Zürich, Moscow, and Berne.

The pedagogic museum holds the relation to the general museum that the pedagogical library holds to the general library. The general library

attempts to make a collection of books exhaustive of its kind, and the general museum attempts to make a general collection of articles exhaustive of its kind and illustrative of its subject.

What Mr. Perkins, that eminent friend of art, has said of collections in his department, viz, that "we aim at collecting material for the education of the nation in art, not in making collections of art," educators may say with reference to museums illustrative of education. We do not seek to make collections of objects of curiosity merely. We seek to make collections which will be illustrative of the condition, progress, and improvement in education, whether these relate to systems, or institutions, or methods, or subjects, or appliances.

All who have studied the development of education in Ontario under the eminent Dr. Ryerson have been impressed with the aid his improvements received from the educational museum he so early established.

The Japanese government, after sending commissioners to see the best systems, institutions, and methods, and calling to their aid experts, administrators, and teachers from all parts of the world, expended large sums of money in collecting the material for a museum illustrative of education.

Few governments are more thoroughly convinced of the necessity of educational museums than the government of the French Republic. There may have been differences of opinion among the great men who have been at the head of the ministry of public instruction since 1870—Messrs. Jules Simon, Waddington, Bardoux, and Jules Ferry—but on this point they are not divided.

In 1878, when France had no educational museum, the government appropriated 100,000 francs in order to enable the teachers to visit the Paris Exposition, the museum par excellence. M. Bardoux, minister of public instruction, in addressing the 12,000 teachers who had come to Paris, said, among other things:

You cannot be good teachers unless you are continually learning yourselves, and you cannot instruct children successfully unless you study every day the progress of the art of teaching. You must acquaint yourselves with new methods of teaching and with the latest improvements in school apparatus. We (the government) intend to establish educational libraries all over the country, and we shall endeavor to give you permanent cantonal museums.

Pedagogical aids advance most rapidly in the form of libraries. According to the report dated in 1880, 929 of these libraries were established in France. According to recent information they have increased to 1,725. Some departments have one and others as many as sixty-three.

Jules Ferry, minister of public instruction, published a suggestive list of books from which selections could be made by those organizing these libraries. First, are works relating to general pedagogics, such as those of Rollin, Madame Necker, Rousseau, Guizot, Locke, Herbert Spencer, and Jules Simon; second, works on practical pedagogics, those by de

Gérando, Girard, Madame Pape-Carpentier, Levasseur, and Legouvé; third, books of reference, such as the works of Joly, Cuvier, Hippeau, Buisson, and Gréard; fourth, works on the history of education at home and abroad, foreign and domestic school legislation and reports.

The minister adds:

It is not the number of books, but their value, which makes a pedagogic library.

The question of establishing museums illustrative of education has long interested American teachers and officials. They have closely watched the progress of this idea elsewhere and have considered its application at home. Their opinions, as expressed in a large number of letters recently received at the Bureau of Education, are strongly in favor of establishing such a museum in connection with the educational library already collected, in order that the first source of information for the student of pedagogics, namely, the literature of the subject, may be adequately supplemented by the second, to wit, its illustration.

They believe that there should be one place in the country where the American educator or teacher may study all that is known touching any given phase of education. They also believe that the nation can and should do this, which States and cities, however powerful, cannot do as well, and which private institutions, for obvious reasons, cannot hope to accomplish at all.

A small appropriation has been made by Congress for cataloguing, caring for, and increasing this collection, and the Bureau desires the best suggestions from every quarter in order to make its use most effective for the improvement of education throughout the country, as contemplated in these brief statements and hints.

A telegram was received and read from Superintendent Andrew J. Rickoff, of Cleveland, Ohio, announcing his inability to be present on account of illness.

It was then voted that Hon. J. W. Patterson should deliver his address in the afternoon instead of the evening, as announced.

Mrs. WALWORTH, school commissioner of Saratoga Springs, N. Y., asked whether something could not be done to teach the elementary principles of honesty and morality in the public schools.

Mr. GOVE, of Colorado, said that there was no city in the country where the teacher was not required to present testimony of a moral character and upright life, and that the influence of the teacher was better than text books or formulas of morality.

Mr. DEWOLF, of Ohio, urged that the committing to memory of the gems of literature was a most efficient means of teaching morality, and said that much could be done by the teachers towards answering these questions by living good and godly lives themselves.

Mr. MURPHY, of New York, thought that some teachers were not of high moral character, and cited the case of a teacher in Troy who sent her pupils out to buy beer.

Mr. NORTHROP, of Connecticut, said that what this gentleman had said he believed to be exceptional; he thought the great majority of the teachers in the public schools were christian teachers, who were seeking to illustrate by their lives the principles of morality and virtue.

Mr. SANFORD, of Middletown, N. Y., rose to advocate the morality of the teachers of his State, and was followed by Mr. Barringer, of Newark, N. J.

Hon. J. W. PATTERSON, observing that General Eaton had called attention to the fact that education has two sides, objective and subjective, said that the child at home begins his instruction in the objective method, which is the natural method of teaching. The perceptive faculties are developed first; afterwards the child begins to reflect. Object teaching is as old as the world. He asked if there was not danger that the other side of education, the development of the power of thought, might be forgotten.

Mr. SMART, of Indiana, recurring to the point introduced by Mrs. Walworth, wished to enter a protest against the assumption that the schoolmaster is responsible for everything. He denied that he had such responsibility. He thought that children are not cared for at home as they should be. Still, teachers do not do as well as they can. The best kind of work and the best instruction in morals are going on in schools every hour of the day. In his judgment the power of self control is one of the greatest moral forces, and the schools were teaching this very thing.

Mr. SLADE, of Illinois, thought it was the influence exerted by the teacher that would tell, not what is in books; that if the pupils were to be made what they should be there must be character in the teachers. The public schools are the grand leveller, not by dragging any down, but by bringing up the lowly and the humble.

Mrs. WALWORTH explained that she did not bring any charges against teachers, as they were generally well meaning and intelligent, but she thought many teachers in the northern part of New York had little knowledge and might receive instruction on this point.

Dr. PHILBRICK, of Massachusetts, referred to the paper which had been read as in no way one-sided, but an exact statement of facts. No substantial progress could be made, except in the solid study of education or pedagogics. One important thing is to have pedagogical libraries; another, to have a great pedagogical museum at Washington.

General EATON moved that a committee of five on resolutions be appointed. Adopted. He then expressed regret that Dr. Elisha Harris, of Albany, N. Y., who was to read a paper on "Education and health," could not be present.

Remarks were then made by Mr. Carleton, Mrs. Hunt, Dr. Philbrick, and General Eaton, and the department then adjourned, to meet at 3 P. M.

FIFTH SESSION—THURSDAY AFTERNOON.

NEW YORK, *February 10, 1881.*

Mr. MARBLE announced the committee on resolutions as follows: J. O. Wilson, District of Columbia; H. S. Jones, Pennsylvania; Charles Northend, Connecticut; Aaron Gove, Colorado; and E. A. Apgar, New Jersey.

Hon. J. W. PATTERSON, State superintendent of public instruction in New Hampshire, read the following paper :

NATIONAL AID TO EDUCATION.

The old masters of the world arrogantly assumed that every Roman citizen was born a ruler; and hence the vainest as well as the greatest of Roman orators said, "Any one can make himself a jurisconsult in a week, but an orator is the production of a lifetime." Aristotle, more thoughtful and observant of the causes and drift of human affairs, said, "All who have meditated on the art of governing mankind have been convinced that the fate of empires depends on the education of children." The political philosophy of the great Athenian voices the experience of all the ages since his day. It would be easy to fill the time allotted to me with utterances of similar import from publicists and practical statesmen of every period and phase of civil progress.

The conservative forces of government are moral, not physical. It is the intent and spirit of the people which give validity and inviolability to law. Without this it is soulless and impotent. Statutes cannot bring order and prosperity to a state whose citizens are not a law unto themselves. A people who have not an intelligent appreciation of liberty, and do not see the line beyond which it passes into license, will perpetually chafe and rebel against its necessary limitations. They are not safe guardians of civil freedom, if they do not apprehend its nature and the institutions by which it is reduced to a system of practical government. Individuals who, like children and madmen, have not the capacity or disposition to govern themselves in a way to subserve their own or the public interest, cannot claim the right of self government. Equally, a state in which a large majority of the people do not comprehend the nature and genius of free institutions cannot assert the right of popular government, and has no cause to complain of the restraints of a higher power that would suppress the violence or fraud that tends to the overthrow of law and liberty. Should the intelligence of the electorate of any State of our Union decline so low as to render self rule a farce or a peril, unquestionably that article of the Constitution of the General Government which guarantees a republican form to every State comes into action and is paramount to all State authority. The guarantee carries with it an implied power to guard against such a contingency, not necessarily by force, but by

demanding or providing in each State the means of popular education. It is idle longer to talk of this as an exclusively local or State question. It involves the welfare and life of the Union, and is therefore a national question. It is true, "the national charter," as Judge Tourgee has said, "is dumb in regard to it;" but it is potentially in it. The conception is as old as the convention of 1787, and destined soon to come to its birth in some living form. As the great war powers slumbered in the Constitution till awakened into activity by the necessities of the Government, so this will be seen to be a legitimate offspring of fundamental law when the instinct of self preservation shall demand it. The Republic carries with it, written or implied, the right to perpetuate itself; and national education being essential to that end, its maintenance will be found necessary to transmute the blind, brutal instincts of ignorant masses into intelligent forces of strength and prosperity. We have not yet realized the full measure of disaster possible to a free state based upon popular ignorance, but the drama is on the stage and may yet become a tragedy of blood.

I will not repeat statistics familiar to the public mind, but must recall for your reflection the painful fact that 45 per cent. of illiteracy in sixteen States of the Union has not only placed all political power, in that section of the country, in the hands of a majority of the remaining 55 per cent. of voters, but, not to mention its weight in the electoral college, has given to one-twelfth of the voting force of the Republic 72 per cent. of power in the lower and 84 per cent. in the upper branch of Congress. The illiterate balance of power, incapable of understanding or too weak to defend their rights, may be excluded or defrauded at the polls, the constitutional guarantee of State republics defied, and the vast interests of the country subjected to a usurped power of legislation.

But history suggests to our apprehension yet graver perils. This blended mass of humanity, which to-day may be the convenient instrument of personal avarice or ambition, awakened in the bitter conflicts of party to a consciousness of its strength, held by no moral restraints, and maddened by some real or fancied social wrong, may at length sweep down, with the resistless power of elemental forces, in the States so cursed, all the forms and landmarks of an inherited liberty, or, like a Parisian mob, stain its altars with the blood of the purest and ablest of the land. Should such an emergency come to us, as it has to other republics, nothing but national power could arrest the desolation; and the Executive, in the discharge of his duty, would be forced to intervene to rescue society from destruction. When we reflect that such possibilities may become an accomplished fact, shall our activity in the cause of popular education be paralyzed by the timid assertion that the work is not national, but one left to the care of the several States? What if the States refuse or neglect to care for this common interest; shall the nation slumber over the restless volcano till it is too late to save our interests, our honor, or our liberties? A people upon whom the respon-

sibilities of the ballot have been cast have a right to demand of the government which conferred it a degree of intellectual training which shall enable them safely to discharge its functions. But we are told we cannot afford to thus secure the future at the cost of sacrificing the fundamental principle of the local distribution of power. Here we are met again by the ever recurring, never ending dogma of State sovereignty, which, without the discrimination of the ghost of Banquo, stalks obtrusively into every subject, seemingly unconscious that it is a ghost. State rights are sacred and impregnable barriers to the usurpations of central power, but are impotent and untimely obstructions in the path of national safety. Will not all State rights perish in the doom that awaits the universal decline of popular intelligence? But will some advocate of local sovereignty tell us how a national supervision of this great department of the common welfare is to imperil State rights more than the regulation of commerce and currency? The exercise of concurrent educational powers in the States is no more dangerous to personal or State rights than the discharge of concurrent judicial functions or the exercise of a concurrent power of taxation. The objection is the spectre of a disordered fancy, and has no real existence. But if it were true, it would be no loss to exchange a paralyzed State function for a national one that would breathe vitality through the whole organism of society. Of what value are rights to a State, if its population cannot discriminate or comprehend them, and have not the ability or spirit to defend them? Abstract political powers are a utopian dream without the intelligence to recognize and embody them in practical laws and institutions. Political power is a dangerous weapon in the hands of a people who have not the wealth, the arts, the utilities, the industries, the altars, and the homes that spring from the schools. Not simply our foreign influence and Federal unity, but the domestic prosperity and security of the States must fall with the decline of local intelligence.

The laws of trade and social economy, the inventive skill, the thrift and enterprise of business, the capacity for industrial production, and the accumulations of wealth, the growth of brain power, and moral stamina which bring influence and character to communities have their birth and nourishment in the schools. All these and the absolute security of States against the encroachments of Federal power will be found in a system of free universal education. The ingenuity and skill of the workshop, the sense and manliness of the farm, the scope and enterprise of commerce, the genius and heroism of arms, the wealth and pathos of literature—all industries and all professions droop and die in the eclipse of popular intelligence.

The question of congressional aid to education is fundamental, and has been forced into the arena of legislation against the wish of parties by vexed problems for which statecraft can find no other solution. The situation is abnormal and disgraceful, and demands the forecast of prudent statesmanship rather than the empiricism of politics. Experience

teaches us that this great interest cannot longer be left to the exclusive care of the States.

The census of 1870 revealed the startling fact that more than one-fourth of our whole population above the age of ten years could neither read nor write and more than one-half the population of the late slave States above that age were illiterate. We do not allude to this in a spirit of crimination, but because it is an essential fact in the discussion. The advantage of the North, and especially of New England, in this regard has resulted from the circumstances of settlement and the character of their industries. This difference constitutes no legitimate ground of inaction. We of the North cannot innocently refuse to coöperate in an effort to remedy this great public peril because it is largely local, nor ought we to complain that the funds demanded for its removal, to be effective, will have to be distributed on the basis of illiteracy, and therefore unequally; for, while we may not derive as many advantages, we shall be benefited as essentially as the less favored section and in the only way in which the evil can be reached. We are one people. Our industrial and political interests are bound in a perpetual wedlock, and the whole family of States must rise or fall together. We cannot say one to the other, "I have no need of thee," but the members should have the same care one for another, and whether one member suffer, all the members suffer with it, or one member be honored, all the members rejoice with it.

There is an explicit grant of power in the third section of the fourth article of the Constitution, "to dispose of, and make all needful rules and regulations respecting, the territory or other property belonging to the United States." Basing its action upon this constitutional provision, Congress, in pursuance of a policy adopted anterior to the organic law, has, at successive periods since the administration of Washington, made grants of land for educational purposes, aggregating 95,737,714 acres. It has also made direct appropriations of money for this purpose, which amount to \$47,785,197.93. In many of these cases Congress has made, in accordance with the letter of the Constitution, specific regulations for the expenditure of the sums appropriated.

In view of this record, covering the whole period of our history, it is too late to question the power of the General Government to appropriate public funds for educational purposes and to disburse the same directly by its own agents. Such appropriations on the basis of illiteracy are not liable to the charge of an unequal distribution of public funds; for they are not given as donations to States or citizens, but for "the common defence and general welfare." Like forts and lighthouses at ports of entry and military and naval schools, they are not local but general in their purpose and effects. But in what form this national aid can best be applied is a practical question, demanding the most careful consideration. The independent *right* of the General Government to educate its people for the proper discharge of their public functions is incident to

its very existence. But as intelligence is an antecedent condition of self government, it must be conceded that the right to educate its citizens belongs also to each State; that right, however, cannot *limit* the obligation to the States, for the citizens of the States are citizens of the United States, and therefore the General Government, whose powers are supreme within their range, is bound to secure to all the children of the Republic, directly or through the States, suitable and sufficient opportunities to prepare them to discharge intelligently and safely their political duties. The public welfare is the supreme law of every State, whether founded upon a written or unwritten constitution; but the attempt to supplant State schools by a national system, or to establish a binary system, would be a measure so radical and hazardous that it should only be resorted to as a last expedient against the dissolution of the Republic. On the other hand, the distribution to the States of national funds, to be disbursed by them without supervision or responsibility, would be a failure as a permanent educational policy. Revenues so received would be lost in the scuffle and antagonisms of politics, or, like the old "surplus revenue" of 1836, vanish into thin air through a thousand follies. Should this not happen it would be diverted into special channels by dominant State prejudices or be made to minister to the higher education, while popular ignorance, which it is designed to remove, would be left to increase.

Colleges and universities will spring as a natural growth from public intelligence, but common schools must be planted and fostered by the government. The most urgent demand of the Republic to-day, looking at its political and social necessities, is a system of free primary instruction that shall reach all classes, races, and sects, and be directed and inspired by a supervision at once intelligent and unflagging. Unfortunately, districts the most benighted and deplorable are the last to realize their situation, and others have not the means to better their condition. National aid should be applied to the localities and populations most in want, and by an impartial intelligence that will make no mistakes.

In matters of such moment Congress should be guided by the rules of business which hold between private parties. Let it be sure that the thing paid for will be received. Security is the law of business between honest men, and surely parties who ignore conscience and repudiate solemn obligations have no reason to complain if held to the same rule.

To devise a wise and practical plan of national aid and supervision of instruction should be the work of an intelligent commission familiar with the wants and conditions of all sections; and even this would have to be perfected by experience, like other permanent institutions.

I would not presume to foreshadow a system in matters so fundamental and organic; but we may venture to suggest that the plan adopted and so successfully administered in the distribution and application of the Peabody fund would be a safe and instructive precedent for statesmen in the disposition of national funds to the same cause. I am disposed

to believe that, whether the proposed aid is to come from an invested fund or from annual appropriations, it should be paid directly to districts by educated and responsible agents appointed by the executive, and on such conditions as to improve and lengthen schools already existing and to secure the establishment of others in localities where they are needed. These school agents should act in harmony with local officials as far as possible, but be independent of State control and required to examine by visitation and report in detail the condition and wants of their respective districts to the Commissioner of Education. Such beneficent supervision by the Government if judiciously conducted would be felt to be beneficial to all interests, and would serve to draw the fellowship of the States into a closer union by invisible ties of gratitude and love. Or, if in any case prejudice, pride, or some fancied right should refuse to submit to an inspection designed to increase and perpetuate the blessings of liberty, it would furnish to the Government an opportunity to assert its paramount sovereignty in a case that would command the approval of mankind, which might be an incident little to be feared or regretted. It is best that the lines of power should be sharply drawn, and questions of jurisdiction set at rest by the court. We do not insist on mixed schools nor attempt to lay down the specific conditions on which public moneys shall be distributed for educational purposes; but we insist that it should be in accordance with the constitutional provision that "No State shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States."

I am not unaware that this scheme of national intervention in the educational interests of the country has been opposed on the plea that we cannot show any express power delegated to Congress to establish a system of schools in the States, and that consequently the power is reserved to and belongs only to the States. Our answer is that the objection is irrelevant, for we are not asking for the overthrow of State systems or the establishment of a national system. We are simply asking that Congress may go into the States and direct the expenditure of funds which, it is admitted, it has a right to appropriate for such purposes.

When Government appropriates public moneys, they should be disbursed by agents responsible to itself; but, if States have exclusive control of education, funds given for its advancement may be so diverted as to defeat the end in view. It has been done, and may be done again, without remedy.

But the right of such *supervision* is denied, on the allegation that it is not in the bond. I admit it is not in the letter; but I claim that it is the intrinsic life of the bond, without which it could not exist. If we are to deny to Congress all powers incidental to those expressed in the Constitution, we must abolish the Department of Agriculture and the Coast Survey, so essential to two of the great industries of the country;

shut up our Naval and Military Academies, and fold our arms in war and rebellion, and go to pieces for want of the constitutional power of self defence. Nay, one-third of the legislation of Congress is void, and the very charter of our liberties becomes a procrustean bed upon which the Republic is bound, and beyond which it can never hope to reach in all the progress of the ages.

We are told that "Federal education was not contemplated as necessary to 'establish justice, to insure domestic tranquillity, provide for the common defense, promote the general welfare, and secure the blessings of liberty to the people.'" Such language in our country and at our time is marvellous. Without popular education popular governments have no right of existence and cannot be maintained when established. The Republic has as legitimate a right to protect itself against ignorance as against pestilence and rebellion. Education informs and quickens the inventive powers, by which improved methods and new forces are given to productive industry; it lifts the poor from the ranks of dependent labor into the fields of enterprise and responsibility, and surrounds them with the utilities and beauties of life; it opens to the intellect the realms of thought, and leads it through the galleries of art and science; it gives to the nation wealth for poverty, strength for weakness, and primacy for subordination; but not for one or all of these does the Republic open its treasury for the advancement of knowledge. It is solely as an act of self defence that the Government comes to the rescue of the schools. For this, if the proceeds of the sale of the public lands are insufficient, it has the right to pour out millions and dictate and control the method and the direction of their disbursement.

In this connection we should remember that the strongest defences of nations are not armies and navies, but the affections and patriotism of their citizens. A common pride in the achievements and a common faith in the character and destiny of the government are essential to its peace and perpetuity. Discordant creeds are the precursors of faction and dissolution. The schools are the nurseries of public sentiment, and should have but one curriculum of political philosophy and civil history. The past is admonitory of the future. To remove a cancer and leave its roots is not cure, but relief. The fatal hour is only delayed. In war he conquers whose principle survives the conflict of arms. If history is reversed, if treason and patriotism are transformed, if opposite theories of government are inculcated, and pride and shame interchanged in our sources of national thought, are we acting the part of a prudent regard for the welfare of posterity? Are we not holding a chalice of blood to the lips of our children, and is it playing the rôle of statesmen for our public men to shut their eyes and ignore such facts? Has our government no power to enforce, I do not say a uniformity of text books, but the inculcation of a common national sentiment and political philosophy in the schools?

I realize how difficult and delicate is the subject of which I speak,

but it is legitimate to the occasion, and it would be cowardly to blink it out of sight. I cherish no feeling of sectionalism and would utter no word of crimination; but I am sure it is not wisdom to allow great dangers to drift us in silence into irretrievable ruin, when there is no real ground of difference of theory or action, but only pride and prejudice. The irreconcilable antagonism between free and slave labor, from which sprang the divergent theories and sectional bitterness of our old time politics, having perished with the war, there is nothing left but habits of thought and wounded pride to withhold us from mutual regard and a cordial coöperation in all that can advance the prosperity and glory of the country. Neither can deny to the other honesty of convictions or courage in battle, and this rescues the dead of both sections from dishonor. Why contend longer over obstructions and dead issues? Credit and trade, labor and skill, civil power and the social amenities, are all paralyzed by this persistent rancor of sectional jealousy, surviving its causes for a score of years. Our respective industries would be strengthened and made lucrative by mutual confidence and the fraternal emulations of business. Property would appreciate and resources develop, science be quickened and literature enriched, private virtue become more sacred and social happiness more universal, if we should give less time to the differentia of politics and more to the essentials of life. So long as opposing theories as to the nature and later history of the Government shall be taught in the different States, so long there will be bitterness and vituperation in the press, angry debates and disgraceful scenes in Congress, and portents of more direful disasters in the future.

But the cure must come from without. The Ethiopian cannot change his skin, nor an insane man reverse his thoughts. If reason and self interest have lost their control in the States, there must be a supreme power that holds and moves them in their orbits, if we are a nation, that can reach and remove the causes of discontent and peril.

The census reveals the fact that a large percentage of the illiterates of the country are of foreign birth. Emigration has become the policy of European states, as a relief to their institutions from the strain beneath. Our country has been made the field into which the ignorance, poverty, and hate of these revolutionary masses have been poured. Like pent-up gases they become harmless, for the most part, when the pressure is removed; but, crippled in capacity and with nothing to tax, they crowd under the protection of Federal law into the States and fill their school-houses with children. It is but right, therefore, that the enhanced burdens thus thrown upon the property of the States, if they do their duty to the children, and which in the aggregate amount to millions, should be relieved by national aid. There must be a rapid and constant decline in the intelligence, capacity, and character of our population, if these teeming millions are left uneducated and unassimilated.

We do not often stop to consider what changes have taken place since our gates were thrown open to the world. The influx of the overcrowded

peoples East and West by the modern facilities of transportation could not be anticipated a century ago. This change necessitates corresponding changes in our internal policy. The schools must be multiplied and improved in methods and force, so as to keep pace with this drifting multitude, whose numbers outrun their means.

The failure to assimilate these millions, and bring them into full sympathy with our institutions and habits of thought, is already felt, especially in those great centres into which they have crowded in the largest numbers. It is not immigration or change we deprecate, but deterioration. The successive invasions of England were terrible visitations, but they poured fresh vigor and broader sentiments into the old Briton, from whose mixed blood has sprung the brawny liberty loving Englishman of history. With them there was a constant growth through their ages of battle. But our pauper immigrants are not Saxon or Norman invaders, and we fear a constant decline through our ages of trade. The children of these strangers within our gates must be made American in thrift and skill and in their political aspirations and pride; they must be lifted by knowledge above the control of party passion and be inspired with a personality that will not suffer them to be the tools of personal ambition; they must be made to apprehend the nature and genius of our institutions and to love the flag of the Republic as the symbol of freedom and power. Does the past justify us in the belief that the States will do all this? The age is characterized by broader views and quickened efforts in the cause of popular education. Governments have at last been forced to adopt it as the policy of success. Its power has been discovered in the productive force imparted to industry, in the triumphs of science, and in the achievements of war. Discoveries and inventions are the footsteps of its progress; it is recognized in the gift of the ballot and the subordination of leaders to the popular will; it is heard, not in the drum roll, but in the music of machinery; its growth is realized in the widened uses of literature and the utilities of art; lightning and steam are the contestants in its Olympiads, and it gathers its battle flags at Sedan.

While the statesmanship of Europe is pouring out millions in the rivalry of her systems of schools, shall we stand still to be swamped in the surf that rolls from her shores? To-day we are hardly abreast with England, France, and Prussia in the character and resources of our schools. And shall we be told that the Government must fold its arms with the shallow pretence of a want of power and leave this work exclusively to the States, which cannot realize or feel the responsibility of this magnificent competition of empires in the march of knowledge and the growth of mental power? The policy will be a cowardly and suicidal acknowledgment of impotency, and, if persisted in, we shall learn to our sorrow that an ignorant people is an inferior people in all the elements of national greatness. If the bill now pending before Congress is too narrow for either aid or incitement, let its gifts be enlarged to the

measure of our wants. The nation is not impoverished when it gives to itself. Revenues so bestowed will be a profitable investment. It is but casting bread upon the waters that will be found after many days.

We should be glad to help build the waste places made desolate by war, if only hereafter they may be allowed to blossom with the fruits of an intelligent industry and social peace. The day is not distant, I trust, when both the North and South will learn that the rivalries of labor and trade and the emulations of literature and science are more profitable than the squabbles of politics or the feeding of old fires that ought to be dead. Let us unite in the noble enterprise of making our country foremost in the march of intelligence, foremost in the dignity of power, and foremost in the purity of its civilization.

The national domain is the common property of the Republic, and should be used to promote the general welfare. We can conceive of no employment of the proceeds of its sale of more general and lasting utility, and none more honorable to a free, christian people, than its application to the building up of a permanent system of free schools that shall be adequate to supply the demands of the future. This is an essential condition of national stability and prosperity. No subject of legislation more urgently demands a liberal appropriation than this. It will be an irreparable misfortune if, in a scheme so grand in its nature and so far reaching in its influence, we come to a deadlock over the puerile conceit that any material or moral interest can suffer from a concurrent but carefully defined advisory control of popular education by the General Government. In this the interests of the State and nation are one, and coöperation may bring them more closely together. Nothing is demanded which can limit or subvert any valuable prerogative of State power. Enlarged intelligence imparts a clearer apprehension of rights and an enhanced power to defend them. Armies and navies are defences against foreign aggression, but school-houses are the natural and effective security of governments against the domestic faction and violence that are engendered in the homes of ignorance.

The people are the sovereigns and citizens of both the State and the nation, and can claim the right to be fitted for their political functions from both. When the first is unable to discharge its trust, the latter should come to its aid in a peaceful coöperation. But when a State wilfully neglects to provide the means of knowledge for the poorest and humblest of its children, the supreme power of the nation possesses, beyond a reasonable doubt, the right to intervene in the interest of national intelligence, and provide, in such way and by such agents as Congress may judge best, for the education of the children of its neglected citizens. But we will not dwell upon this, for the question to-day before the American people is rather one of patriotism than one of right. The call is not to the defence of a prerogative, but to the discharge of an imperative duty. National inferiority and ultimate anarchy or despotism are the inevitable fruits of popular ignorance, that cannot

discern the real interests or the conditions of safety and prosperity to the country. School-houses have done more for the German Empire than military academies for France or great universities for England. Industrial success, military power, political superiority, intellectual achievements, and national character, all have their springs in high popular intelligence. Our destiny as a republic and our place in the march of civilization are involved in the maintenance or failure of a system of free universal education.

The paper excited animated discussion, in which many of those present participated.

Dr. PHILBRICK referred to the interest which Presidents Grant and Hayes had manifested with respect to national aid for education, dwelt upon the favorable progress of public sentiment as shown in the attitude of Congress, and expressed his conviction that the time had come for urging the matter.

Mr. NORTROP, of Connecticut, admitted that his views had changed within a few years, and he believed the present conditions of the country warranted national aid for the support of education.

Mr. NEWELL, of Maryland, deprecated any interference on the part of the General Government with the local management of school affairs, but was deeply impressed with the need of national aid, especially in the work of extending education through the South. While the southern people are anxious to educate their masses, the blacks as well as the whites, he knew that they are not able to bear the expense.

President ANDREWS, of Marietta College, dwelt upon the distinction between national aid and national control. He hoped that the Burnside bill would not pass in its present form, but that the States would receive help according to their illiteracy.

Mr. MOWEY, of Rhode Island, believed that the power and influence of the National Government should be exercised within proper limits in the interests of education, and he desired the passage of the Burnside bill as a measure of great public utility.

Mr. MARBLE announced that the hearing of the reports of the committees was in order.

Mr. SMART, chairman of the committee to memorialize Congress, said that the committee were not prepared to report yet.

It was voted to leave this matter to the further consideration of the committee, and it was authorized to attach the names of the members to the memorial.

The committee on the unification of school statistics was also continued.

By invitation FREDERICK A. TALCOTT, of the world's fair committee, addressed the meeting and presented the claims of the fair, asking the coöperation of the teachers in making a fine educational display. He was followed by Ex-Governor Crawford.

The following resolutions were adopted :

Resolved, That the members of the National Superintendents' Association, now assembled, have heard with pleasure the statements in regard to the forthcoming world's fair of 1883, which have just been made by the gentlemen representing the commission, and that in response thereto we hereby pledge our hearty support to this great enterprise. We pledge also our best endeavors to make an exhibition of our educational products at the fair which shall form one of its most interesting and profitable features.

Resolved further, That the executive committee of the United States international commission be hereby requested to place the educational exhibit of the world's fair of 1883 on an equality of rank with the other great sections of the exhibition, and that a separate department be created in which all the educational products exhibited by institutions, States, and nations may be placed.

Mr. WILSON, of Washington, chairman of the committee on resolutions, submitted the following resolutions, which were adopted :

Resolved, That the thanks of the Department of Superintendence of the National Educational Association are due and are hereby tendered to Superintendent N. A. Calkins and the friends of education of New York associated with him, for the admirable arrangements made for the present meeting and for the elegant and bountiful entertainment provided for the members on Wednesday evening.

Resolved, That the thanks of the department are due and are hereby tendered to the president of the College of the City of New York, the president of the Normal College, and the superintendent of the Museum of Natural History for cordial invitations to visit their respective institutions.

Resolved, That the thanks of the department are due and are hereby tendered to the proprietors of the Grand Central Hotel for the excellent accommodations afforded the members at special rates.

Dr. WICKERSHAM moved that the association reiterate its former opinion in regard to national aid to education. Carried.

Mr. MOWRY announced the next meeting of the American Institute of Instruction.

The department then adjourned sine die.

CIRCULARS OF INFORMATION

OF THE

BUREAU OF EDUCATION.

N o . 4-1881.

EDUCATION IN FRANCE.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1881.

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LETTER.

DEPARTMENT OF THE INTERIOR,
BUREAU OF EDUCATION,
Washington, D. C., September 24, 1881.

SIR: This Office from time to time has published circulars of information concerning the condition of education in foreign countries. These circulars have done much good, because they have enabled educators here, without going abroad, to compare foreign systems and methods with ours.

The necessity and usefulness of studying foreign school systems have been recognized by all civilized nations. When the French authorities began to investigate the general illiteracy of the population of France, they sent an eminent educator, M. Victor Cousin, to Prussia to see what could be learned from that enlightened nation. M. Cousin's recommendations were of great value to M. Guizot in the preparation of the fundamental school law.

France renewed this practice in 1873, when another eminent educator, M. F. Buisson, was sent to Vienna to study the school systems of the different nations represented at the Universal Exhibition of 1873. M. Buisson especially recommended on his return the preparation of annual school statistics as they are exhibited by this Office in its annual reports.

Again, in 1876, France sent a delegation of six members, under the presidency of M. Buisson, to this country to study our elementary school system, with a view to introducing reforms at home. The result of this visit was a valuable and voluminous report that exerted a great influence on French education. All the educational projects of law and ministerial decrees since 1876 have been largely affected by American methods. The opponents of the republic are fully aware of this fact; they openly declare that the present government intends to Americanize the whole French school system.

The necessity and usefulness of studying foreign school systems was equally recognized by the English schools inquiry commission, which charged Rev. James Frazer, now bishop of Manchester, and Matthew Arnold to study the condition of education abroad.

The Bolivian authorities, in 1872, made a special study of American schools, preparatory to a reorganization of the school system in that state.

In the same year an educational commission formed part of the ex-

bassy extraordinary from Japan to the United States. The head of this commission (afterwards vice minister of the Japanese department of education) came to this Office and made a thorough preliminary study of statistics, facts, methods, and laws. He then went to several important educational centres in the country and personally investigated the practical workings of American ideas and methods. Ever since, the Japanese educational department has corresponded and exchanged documents with this Office. Mr. Tanaka not long ago was promoted to another ministry, but the following letter shows that the department has not forgotten the service rendered:

TOKIO, NIPPON,

Fourth, second month, fourteenth year of Meiji (1881).

SIR: I have the honor to inform you that I have recently been appointed minister of education. I am much gratified to hear that Mr. Tanaka, formerly our vice minister of education, has obtained valuable assistance for promoting the cause of our education through the friendly communications you have kindly consented to keep with him. Now, I sincerely desire that as a successor of Mr. Tanaka I shall equally be honored with your friendship for the future as he has been before.

With best wishes for your happiness and prosperity, I am, sir, your most obedient servant,

KAWANO TOKAMA,
Minister of Education.

HON. JOHN EATON,
Commissioner of Education.

Well informed educators understand how wise was the development of public instruction in the province of Ontario and how successful its practical application to the wants of the people. These results are largely due to the habit of Dr. Ryerson, so long chief superintendent of the province, of studying the educational systems of other countries, and of selecting therefrom those parts which were most suitable to the circumstances of Ontario. Several of his reports are well known and have proved useful in this country.

Austria, in 1876, charged her commissioner general at the Philadelphia Exhibition to prepare a report on education in the United States

Brazil sent a special educational commissioner in 1876 to study our normal school system.

Portugal sent, a few weeks ago, an eminent professor to this Office to get information concerning high schools and colleges; and her minister at Washington was instructed a short time ago to ask this Office for a statement on industrial, technical, and agricultural schools in our country.

Even enlightened Prussia deems the study of foreign systems essential to educational progress. Only recently three eminent educational functionaries were sent to Sweden and Denmark to study the newly established technical departments in primary schools.

American educators are especially anxious to know how school affairs are managed abroad, and particularly in France since the overthrow of the empire in 1870.

A résumé of educational events and school laws in France and other countries has formed a small part of my annual reports. I am at last able to present the accompanying account of education in France, derived from a series of admirable reports covering, in all, 3,523 folio and quarto pages.¹

These reports contain so much valuable information that this abstract of them will doubtless be read with great interest.

I would recommend its publication as a circular of information.

Very respectfully, your obedient servant,

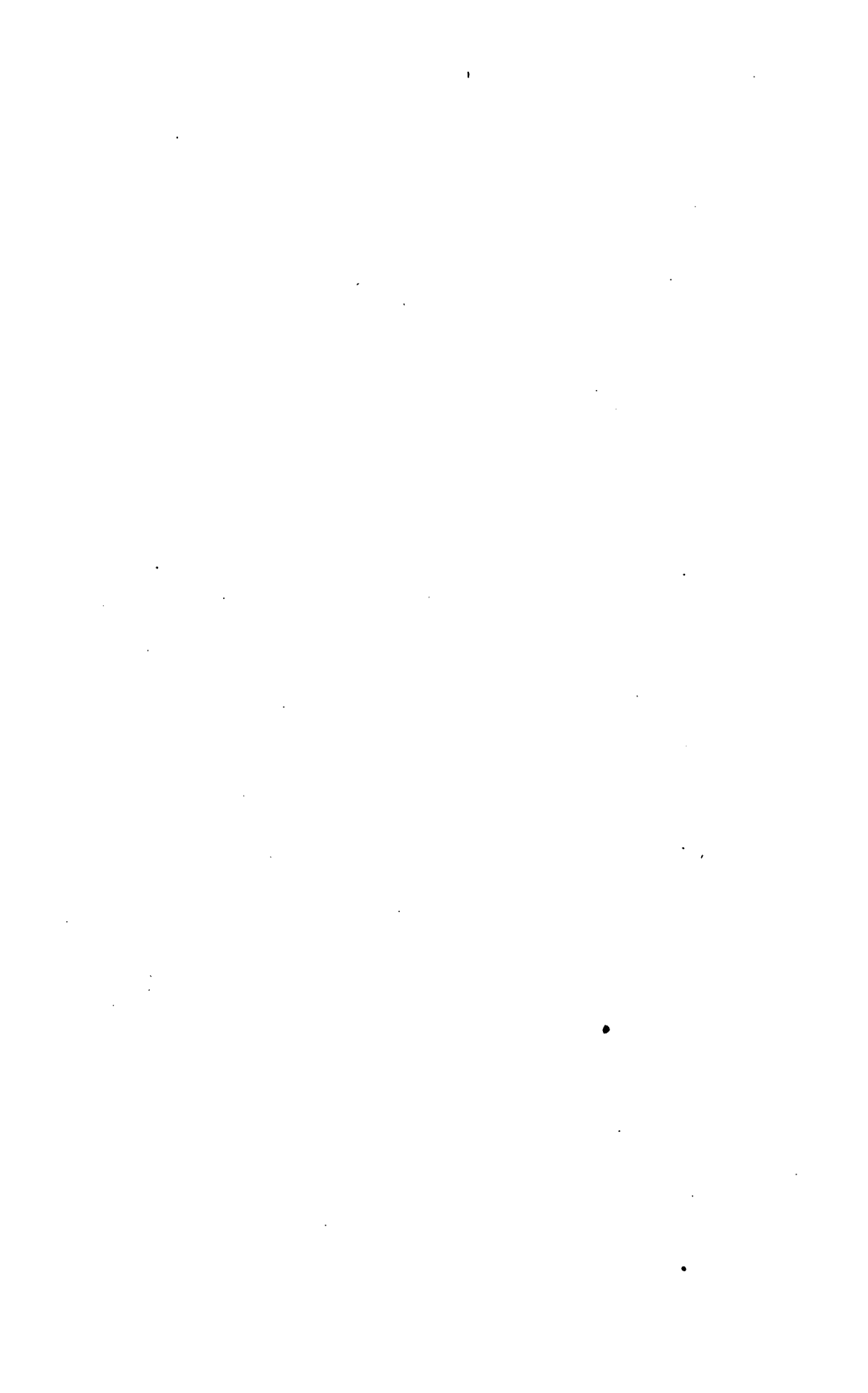
JOHN EATON,
Commissioner.

The Hon. the SECRETARY OF THE INTERIOR.

Publication approved.

S. J. KIRKWOOD,
Secretary.

¹This account is compiled from the latest official reports, viz: (1) *Statistique de l'enseignement primaire. (1876-1877.) Tome premier. Paris, 1878.* (2) *Statistique de l'enseignement primaire. Tome second. Statistique comparée de l'enseignement primaire. (1829-1877.) Paris, 1880.* (3) *L'enseignement primaire à Paris et dans le département de la Seine de 1867 à 1877. Paris, 1878.* (4) *Statistique de l'enseignement secondaire. Paris, 1878.* (5) *Statistique de l'enseignement supérieur. Paris, 1878.* (6) *Annuaire de l'enseignement libre pour 1879.*



INTRODUCTION.

9-10



EDUCATION IN FRANCE.

INTRODUCTORY REMARKS.

France was proclaimed a republic September 4, 1870. The present constitution, voted by the National Assembly, dates from February 25, 1875. It vests the legislative power in an assembly of two houses—the Chamber of Deputies and the Senate—and the executive power in a chief magistrate called President of the Republic. The present incumbent is M. Jules Grévy. The Chamber of Deputies, elected by universal suffrage, is composed of 532 members. The Senate is composed of 300 members, of whom 75 hold their seats for life, the vacancies being filled by the Senate. In the case of the remaining 225 seats the communes and municipalities elect a fixed number of senatorial electors, who in their turn meet together to choose the senators. Of the 225 senators 75 go out at successive periods of three years. The President of the Republic is elected by a majority vote of the Senate and Chamber of Deputies united in National Assembly. He is chosen for seven years and is eligible for reëlection.

France has an area of 204,091 square miles and a population of 36,905,788. The city population is 11,960,724 and the rural population 24,945,064. The number of children between the ages of 6 and 13 is 6,409,087. The whole territory of France is divided into 87 departments, over each of which presides a prefect, who represents the central government. For educational administration France is divided into 16 academic districts, each of which is under the control of a rector, assisted by an academic council. The central towns of the academic districts are the centres of scientific and literary activity. Such towns are Paris, Aix, Besançon, Bordeaux, Caen, Chambéry, Clermont, Dijon, Douai, Grenoble, Lyons, Montpellier, Nancy, Poitiers, Rennes, and Toulouse.

At the head of the educational administration is the minister of public instruction. His department is divided into three sections, each of which has a director. These sections are (1) the section of primary education, (2) the section of secondary education, and (3) the section of superior education.

Special schools are almost exclusively under the control of other ministries.

The minister of public instruction is supported by the superior coun-

oil of public instruction, which has been reorganized by law of February 27, 1880, of which the following is an abstract :

TITLE I.

The superior council of public instruction.

ARTICLE 1. The superior council of public instruction is composed of the minister, president; 5 members of the Institute, elected by the Institute in general assembly and selected from each of the five classes; 9 councillors appointed by the President of the Republic on the nomination of the minister of public instruction and chosen among the present and former directors in the ministry of public instruction, the present and former inspectors general, the present and former rectors, the present and former academic inspectors, and the present and former professors of public schools; 2 professors of the College of France, elected by their colleagues; 1 professor of the Muséum, elected by his colleagues; 1 ordinary professor of the faculties of Catholic theology, elected by his colleagues in general assembly; 1 ordinary professor of the faculties of Protestant theology, elected by his colleagues; 2 ordinary professors of the faculties of law, elected by their colleagues; 2 ordinary professors of the faculties of medicine or mixed faculties, elected by their colleagues; 1 ordinary professor of the Superior School of Pharmacy or the mixed faculties, elected by his colleagues; 2 ordinary professors of the faculties of sciences, elected by their colleagues; 2 ordinary professors of the faculties of letters, elected by their colleagues: 2 delegates of the Superior Normal School, elected by their colleagues from their number; 1 delegate of the Special Normal School (*École normale d'enseignement spécial*), elected by his colleagues from their number; 1 delegate of the *École nationale des chartes* (for the training of archivists and paleographers), elected by his colleagues from their number; 1 ordinary professor of the School of Living Oriental Languages, elected by his colleagues; 1 delegate of the Polytechnic School, elected by his colleagues from their number; 1 delegate of the School of Fine Arts, elected by his colleagues from their number; 1 delegate of the Conservatory of Arts and Trades, elected by his colleagues from their own number; 1 delegate of the School of Arts and Manufactures, elected by his colleagues from their number; 1 delegate of the Agronomic Institute, elected by his colleagues, and from their number; 8 *agrégés* (supernumerary professors of the lycées) from each of the classes of grammar, letters, philosophy, history, mathematics, physical or natural sciences, modern languages, and special education, elected by the whole body of *agrégés* of the same class who are professors or teachers in the lycées; 2 delegates of communal colleges, elected by their colleagues; 6 members of primary education, elected by the inspectors general of primary schools; 4 members of private schools, appointed by the President of the Republic on the nomination of the minister of public instruction; and numerous others.

ART. 2. All the members of the council are appointed for four years. They may be indefinitely reappointed.

ART. 3. The nine councillors appointed by the President of the Republic and six additional members, designated by the minister of public instruction, constitute a permanent committee.

ART. 4. The duties of the permanent committee are to study the programmes and regulations before they are submitted to the deliberation of the superior council, and to give advice relative to the creation of faculties, lycées, colleges, primary normal schools; the creation, reorganization, or suppression of chairs; the class books, library books, and prize books to be prohibited in the public schools; and, finally, all the questions concerning courses of study, school management, and discipline which may be submitted by the minister of public instruction. Whenever a chair in a faculty becomes vacant, the permanent committee, in concurrence with the faculty in which the vacancy exists, presents two candidates. As regards vacancies in the faculties of

theology, the permanent committee gives its advice concerning the nomination made by the minister of public instruction.

ART. 5. The superior council gives its advice relative to the programmes, the methods of study, the examinations, the regulations concerning management and discipline in public schools; the regulations concerning the examinations for degrees and the supervision of private schools; the text books, reading books, and prize books to be prohibited in private schools as being contrary to morals, the constitution, and laws; and the regulations concerning the authorization of foreigners to teach in France or to open a school.

ART. 6. A decree in accordance with the advice of the superior council will fix the fees for matriculation, for examination, and for diplomas in superior institutions of learning, as well as the age for admission to the several grades.

ART. 7. The superior council constitutes a final court of appeal in disputed and disciplinary matters previously decided by the academic councils and departmental councils.

ART. 8. The council holds two general meetings a year, but the minister of public instruction may call extra meetings whenever he deems it necessary.

TITLE II.

Academic councils.

ART. 9. There is an academic council in the principal city of each department. This council is composed of the rector, president; the academic inspectors; the deans of the faculties of Catholic and Protestant theology, law, medicine, sciences, and letters; the directors of the superior state schools of pharmacy, the directors of the schools of medicine and pharmacy, and the directors of the schools preparatory to higher instruction in sciences and letters; 1 ordinary professor of each of the faculties and superior schools named above, elected by their colleagues; 1 ordinary professor of the Preparatory School of Medicine and Pharmacy, elected by his colleagues; 1 ordinary professor of the Superior Preparatory School of Sciences and Letters, elected by his colleagues; 1 provost and 1 principal of a lycée and communal college, appointed by the minister; 2 professors of sciences of the same grade of schools, elected by their colleagues; 2 professors of letters of the same grade of schools elected by their colleagues; 2 professors of sciences and letters of communal colleges, elected by their colleagues; 2 members of the councils general and two of the municipal councils, appointed by the minister.

ART. 10. The members of the academic council are elected or appointed as above for four years. They may be reappointed or reelected.

ART. 11. The academic council gives its advice relative to regulations concerning lycées, communal colleges, and public superior schools, the budgets, and the management and discipline of these institutions. The academic council submits to the minister an annual report on the condition of secondary and superior institutions of learning and on improvements which may be made.

The minister of public instruction or the rector submits to the council disputed or disciplinary questions relating to secondary and superior schools, public and private. The academic council pronounces judgments, from which the defendants may appeal to the superior educational council. The appeal must be noted within two weeks after the announcement of the judgment.

ART. 12. The academic council holds two regular sessions a year. Extra sessions may be called by the minister.

ART. 13. Independent of the disciplinary powers established in articles 7 and 11 of the present law, the minister of public instruction may reprimand teachers of public schools before the academic council, and he may censure them before the superior council. No appeal can be taken from these decisions.

ART. 14. The minister has also the power to transfer a professor of a superior school

to an inferior position after consultation with the superior council, and a secondary teacher after consultation with the permanent committee.

ART. 15. The minister may pronounce a suspension for a period not exceeding one year without withholding the salary. A suspension for a longer period, or with total or partial loss of salary, can be pronounced only by the academic council, or, on appeal, by the superior council.

ART. 16. All laws and regulations contrary to the present law are repealed.

PRIMARY INSTRUCTION.

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PRIMARY INSTRUCTION.

I.

Following is an abstract of the report on primary education for the school year 1876-'77,¹ the introductory remarks being by M. A. Bardoux, minister of public instruction:

INTRODUCTION.

The minister of public instruction has just renewed a practice of the July monarchy which one of the men who have most honored the liberal cause, M. de Montalivet, inaugurated in 1831, and which was continued by the illustrious author of the fundamental law of primary education (M. Guizot), and, thirty years later, by M. Duruy.

It was strange enough that France, while correctly informed relative to commerce and crime, did not publish periodical statistics of the condition and progress of education. "Complete statistics of primary education," said the minister in 1831, "is a means of accelerating in France the progress of civilization. Statistical tables published at fixed dates will acquaint the French people with all the steps they have made on the road to perfection, and these tables will become for us * * * the record of popular education, which is also the chronicle of intelligence, of manners, of general well being."

The bill offered May 16, 1878, the object of which was to found a pedagogic museum and create a special bureau of statistics, proves that the government of the Republic is aware of the necessity of supplying this want, and that it is determined to create a permanent centre of pedagogic information under the direction of the minister of public instruction.²

¹Statistique de l'enseignement primaire. (1876-1877.) Tome premier. Paris, 1878.

²When, on May 16, 1878, M. Bardoux, minister of public instruction, introduced to the Chambers the bill to establish a central bureau of education at Paris, he said:

In my remarks accompanying the budget for 1878, I expressed my regret that France does not possess anything analogous to the National Bureau of Education at Washington. Gentlemen, it is just such a bureau which I now desire to establish, and for which I solicit a favorable vote of the French Assembly. The institution the establishment of which I propose will be, like the Bureau of Education at Washington, above all a centre of pedagogical and statistical information. It will have no functions to exercise other than gathering and distributing information by means of special conferences of teachers, of which it would be the headquarters. These conferences will doubtless afford a good opportunity for the improvement in their work of many zealous teachers, since they will find in the bureau many pedagogical and statistical publications, both of the bureau and of leading educators.

The bill submitted by M. Bardoux passed the Chambers, and the bureau was organized in connection with the new educational museum. The organization and direc-

We have already begun our work; during the Universal Exposition we published the statistics of secondary education for 1876. We shall

tion were first intrusted to M. Ferdinand Buisson, well known as the president of the French educational delegation to the Philadelphia Exhibition in 1876. On the appointment of this gentleman to the directorship of the section of primary education in the ministry of public instruction in 1879, M. B. Berger, one of the members of the same delegation of 1876, was appointed to succeed him. The museum is in the buildings of the former Collège Rollin, 42 rue Lhomond.

The following official report of the minister of public instruction to the President of the Republic shows what M. Jules Ferry, the present minister, has done for the French bureau of education and educational museum:

PARIS, May 13, 1879.

A very remarkable movement has made its appearance in France during the last eight years in favor of popular education, and the public powers have joined this movement by increasing the educational appropriations. It is of importance to direct this movement, and to cause to be produced at the expense of the state, the departments, and the communes all the results which must be expected from it.

Nothing is more useful in this respect than a great centre of information and research which would, under the name of educational museum, bring together official publications, plans of school-houses, school apparatus, text books, and the educational treatises which are highly recommended in France and abroad.

At the close of the Universal Exhibition of Paris the minister of public instruction received from foreign countries a quantity of school appliances which he is in honor bound to make accessible to all the friends of popular education.

By creating this permanent educational bureau, which is at the same time a school museum and a central library of primary education, France will realize, although perhaps a little late, an idea which originated here, for it was first expressed, in 1827, by one of the best disciples of Pestalozzi, M. Jullien, of Paris, in his *L'esquisse d'un ouvrage sur l'éducation comparée*, and from that time the project has been repeatedly brought up. It seemed to be on the point of realization at the Exposition in 1867, at which time another eminent educator, M. Pompée, brought the project to the front.

Various difficulties caused the postponement of the enterprise in France; but several other countries took up the idea and worked it out. Of these, England was the first. Perceiving her artistic inferiority at the Universal Exhibition of 1851, she founded the South Kensington Museum, with a view to organize instruction in drawing. A few years later she annexed an educational section, which contains at present a pedagogical library of 20,000 volumes and a rich collection of school material.

The province of Ontario has imitated the example of the mother country, and we find at Toronto, the capital of the province, a large building containing an art museum, a school library, and a magnificent collection of school appliances. This establishment is under the control of the department of public education.

It is well known how successful were the St. Petersburg Pedagogical Museum and the sketch thereof by General Kohhowski at the Universal Exposition of 1878. This museum, which was established in 1864 with a view to be exclusively useful to the schools dependent on the ministry of war, has become an important division of the Museum of Useful Knowledge at St. Petersburg. It is divided into three sections: the first contains appliances for the military gymnasias and preparatory schools; the second, apparatus for the propagation of practical knowledge; the third, statistical works on the sanitary condition of schools.

In the United States, the great National Teachers' Association passed resolutions, in 1866, urging the establishment at Washington of a National Bureau of Education, whose duty it should be to gather and publish school statistics of the several States of the Union, to organize a collection of foreign educational documents, and to furnish useful information to all the friends of educational progress. Congress and the President of the United States received this resolution favorably, and the Bureau was opened in 1867 as a branch of the Department of the Interior. During the last nine years it has been directed with great ability by General John Eaton. The report and the circulars of information which he publishes every year form some of the most important documents for the contemporary history of public instruction.

The Exhibition at Vienna, in 1873, suggested to several of the European states the establishment of similar institutions. In Italy, for example, Mr. Bonghi, delegate to the Vienna Exhibition, member of the international jury, and soon afterwards minister of public instruction, caused an educational museum to be established at Rome in 1875. It was suspended after Mr. Bonghi left the ministry, but in 1878 it was definitely established.

publish shortly after the close of the Exposition the statistics of superior education and the first volume of the statistics of primary education.

Austria, which on the close of the Exhibition of 1873, had imitated England by creating the Imperial Museum of Industrial Arts, established, besides, a large educational museum, which three years later, at Philadelphia, gave the best idea of its rich collections. Hungary possesses an educational museum at Buda-Pesth; in 1876 this museum contained over 5,000 objects. The educational museums of several large cities in Germany have been arranged after the model of the museum at Vienna. In Switzerland the educational museum of Zürich has increased so rapidly that in 1878 a large building had to be provided. Netherlands inaugurated an educational museum at Amsterdam in December, 1878. It has a rich and varied collection. Finally we see the city of Brussels, in concert with the Educational League, establishing a central educational museum, which, besides its rich collections, offers to the public reading rooms, conferences, and public lectures.

We do not need so many examples to show our country the possibility and the usefulness of a creation which has been so long deferred. As long ago as July 1, 1871, M. Jules Simon took the initiative by a decree authorizing the establishment of an educational museum where books, charts, and appliances for schools, asylums, and adult schools, both French and foreign, were to be exhibited. Consequently, regulations were issued and a commission appointed (May 15, 1872) to examine objects to be admitted. Among the members of this commission we notice the names of MM. Bardoux, Chardon, de Salvandy, Lefébure, La Caze, Calmon, Hérol. An honorary inspector general, M. Rapet, was charged with the direction of the establishment.

A circular letter of December 14, 1872, renewed May 4 and August 6, 1873, informed the rectors of the creation of a school museum, inviting them to have a list prepared containing the titles of all written and printed documents issued in relation to primary education before and after the year 1879. This list was to be the basis of the catalogue of the future general educational library of primary instruction.

Unfortunately the building of the ministry, where all the sections were pretty crowded, could not offer suitable space, and it was thought best to place the museum in the building occupied by the Museum of the City of Paris. The inauguration ceremony took place March 2, 1873. But soon afterwards, May 24, the work was indefinitely postponed for want of a suitable building. The idea abandoned by the administration was taken up again and recommended to the budget commission by M. Bardoux, reporter of the budget of public instruction, who in 1876 expressed his regret that France did not possess anything analogous to the National Bureau of Education at Washington. As minister of public instruction, my honored predecessor (M. Bardoux) submitted May 16, 1878, a project of law creating in the ministry of public instruction a national museum of primary education, comprising a permanent statistical bureau, a French and foreign educational library, and a permanent and public museum of school appliances. The project, preceded by a remarkable "exposé des motifs," was referred, at the request of the minister, to the general commission of primary instruction. This commission favored the principle unanimously, but did not think it well to make it the object of a law, and consequently advised the minister to create the museum by decree. At this time we were holding the Universal Exposition; it was important not to let the rich educational exhibits of foreign countries depart from here without trying to retain by means of exchange or purchase a considerable part of them. M. Bardoux, who did not lose sight of this interesting matter, negotiated with the president and the questors of the Chamber of Deputies for a few rooms in the Palais Bourbon, previously occupied by the international jury. Thanks to the realization of this plan, my administration has been able, if not to classify, at least to collect a considerable number of objects, which have been presented to us or turned over in exchange for our school appliances by different foreign countries. It thus only remains for me to complete the work of my honored predecessor, and I feel this necessity so much the more as the different advisory commissions are unanimous in advising me to organize a museum, a library, and historical, statistical, and pedagogical archives, which would furnish them complete information on the various subjects submitted to their deliberation. These commissions will be the council of the administration, and the museum will, according to M. Bardoux, render the same service to our primary institutions of learning as is rendered to technical education by the Conservatory of Arts and Trades.

It is with this conviction that I request you, Mr. President, to place this useful establishment by decree in the list of public institutions provided for in the budget and installed in government buildings.

Receive, &c.,

JULES FERRY,

Minister of Public Instruction and Fine Arts.

The suggestion of the minister contained in the above report that the educational museum should be made a government institution was at once approved by an official decree of President Grévy.

The very nature of this subject and the care which our collaborators have bestowed upon this work have rendered the task of preparing this volume (the first volume of the statistics of primary education) difficult and long; we wished, however, that it should be published before the close of the year (1878), so as to make the date of this work on primary education in France coincide with the date of similar works prepared by other governments for the (Paris) Exposition, and thus facilitate and make more conclusive the recapitulation and comparison which will make part of the second volume.

In taking up again the practice established forty-five years ago, we are glad to have been able to profit by the experience of our predecessors, and thus to improve the statistical tables of primary education and to give more precision to the results. It is a delicate matter; it is not so easy as is generally imagined to ascertain the number of pupils in a school and their exact attendance; appearances are often deceitful, and the errors which lead to erroneous conclusions may strengthen misapprehensions already existing. That is not what we are aiming at; we want to be enlightened ourselves and to enlighten others; we want to know, as far as our means of investigation reach, the true condition of affairs, no-matter whether good or bad, and we want to publish it with sincerity. It is our firm conviction that we cannot administer well what we do not know well. In studying such a considerable mass of facts as those relative to primary education in France, the only means to arrive at a clear understanding is to consult the statistics prepared after an intelligent plan, executed by competent men, and carefully verified and analyzed in its different parts.

The statistical commission¹ organized in the section of the director of primary education since the beginning of 1876 was animated by the same sentiment. I venture to say that the commission has proved fully equal to its task. Without other ambition than that of exactness, the commission has worked long to lay down the basis of regular statistics. It gives me pleasure to say, in justice to the members of the commission, that they have shown a zeal worthy of commendation in the fulfilment of this task, which was not without difficulty, and that several members have proved by the manner in which they have accomplished it or by the remarks which they have added to their tables that they perfectly understand the importance of such an investigation and the necessity of rigorous accuracy in attaining the aim proposed.

¹ This commission was composed of MM. E. Levasseur, member of the Institute, president; Maurice Block; A. Boutan, director of primary education in the ministry of public instruction; O. Gréard, member of the Institute, director of primary education for the department of the Seine; J.-J. Rapet, honorary inspector general of primary instruction; E. de Resbecq, under director of primary education; F. Buisson, secretary.

The statistics which we publish are the result of these efforts. The commission laid down three series of questions: What are the wants of the country in regard to primary education? What are its resources? What use does the population make of them? That is to say, How many children of school age are there in France? What is the number of schools and teachers? How many pupils attend school? The tables answer these questions. They are preceded by a general résumé, which is divided, like the tables themselves, into eight sections, and in which we consider not only the school population, the educational resources, the number of pupils on the rolls and the number in attendance, but also the accessory resources, as the courses for adults, the school libraries, the statistics of certificated teachers, the number of normal schools and normal courses, and finally the budget of primary education. At the time when the last general census was taken, December, 1876, the number of children between 6 and 13 was 4,502,894 (2,278,295 boys and 2,224,599 girls). The children of school age form a little more than one-eighth of the total population of France, and these constitute the young generation which the country must educate. This school population is not equally distributed in the French territory, and it is not everywhere in the same proportion with the number of inhabitants. There are in proportion more children in the country than in the cities: 61 per cent. in the former and 39 per cent. in the latter. There are regions, such as Brittany and the central districts of France, where the number of children is relatively large; there are other regions where the sparseness of the population, corresponding always with the mediocre financial resources of an extensive territory, compels the children to walk long distances in going to school; and there are still others where the nature of the country renders communication difficult. The problem presented is not the same for all the communes of France. In order to understand the true proportion of the efforts made and the results obtained, it is of importance to ascertain the diversity of conditions. We have done this in regard to the distribution of the population as far as the details of the statistics enabled us to do so. For the education of 4,502,894 children in 1876-'77, we had 71,547 primary schools of all kinds. Of this number, 9,352 were free, but all the public schools, and even a large number of private schools, admit besides the paying pupils a number of children free. Of the 71,547 schools, 25,418 were for boys, 29,126 for girls, and 17,003 mixed. The number of schools under lay teachers was 51,657, 38,149 for boys or for both sexes and 13,508 for girls.

The number of the schools in small villages deserves attention; it amounts to 3,142; it has increased during the last few years, because it has been better understood that in regions which are less favored by means of communication or population regular attendance at school could only be obtained by bringing the school within easy reach of the pupil.

Equally interesting is the table which indicates the number of school-

houses in 1875-'76 in an unsatisfactory condition (34,108) and the number of school buildings needed (17,641). If the law of June 1, 1878, relative to the establishment of a fund for the construction of school-houses needed any justification, these figures would amply furnish it.

The teaching corps of public and private schools of all kinds reaches 110,709, more than one-half the total number (58,992) being women. But in the public schools the women are in the minority, there being only 33,663 to 46,400 men.

The lay schools employ 64,025 persons, 42,249 men and 21,776 women; the religious schools, 46,684, 9,468 men and 37,216 women. While only 28 out of every 100 schools are under the control of religious teachers, we find that 42 per cent. of all the male and female teachers in France are religious persons. This difference will be understood when we consider that the majority of lay schools have but one class and employ only one teacher, while the religious schools very often employ two or more teachers.

The number of certificated teachers is 68,997, 40,171 male lay teachers and 19,325 female lay teachers, 3,768 male religious teachers and 5,733 female religious teachers. It will be perceived from the figures given above that there are 41,712 persons engaged in teaching without certificates of qualification.

The total number of pupils of different ages enrolled during some part of the school year 1876-'77 in public and private primary schools is 4,716,935, 2,400,882 boys and 2,316,053 girls. Of this number, 3,742,376 (1,907,027 boys and 1,835,349 girls) were of school age (6-13). But to this number should be added 64,155 children from 6 to 7 years of age who are admitted to the infant schools and 71,620 boys above 13 years who attend secondary schools. There are thus 3,878,151 children between 6 and 13 who attend some institution of learning. Besides these, we ought to add the number of children who receive instruction in special schools under the jurisdiction of other ministries, or at home, the number in both of which classes cannot be ascertained.

Whatever these numbers may be, we find, by comparing the number of children as given in the census of 1876 with the total number of children enrolled in schools under the jurisdiction of the ministry of public instruction, that 624,743 children between 6 and 13, viz, 270,680 boys and 354,063 girls, have not been at school during the year 1876-'77.

Are all these children deprived of education? Certainly not. Among the school population there is always a certain number of children who go to school late, after their seventh year, and there is still a larger number who leave school for good before they are 14, ordinarily after their first communion. These children have received some instruction, but it is to be regretted that they do not devote the whole period of school age to education, and that they acquire only superficial knowledge during their limited attendance at school. By ascertaining the attendance we know what value is attached to education and what benefits the

children derive from it. We cannot ascertain with certainty the average attendance for the whole country; we must form an idea of the whole by studying the details of the statistics, and we therefore indicate the attendance by months and departments.

In December and January the attendance in most departments rose to more than 90 per cent. of the enrolment of the whole year, and in the rural districts of some departments it fell off to 60 per cent. in the months of July and August.

Since it is our conviction that the data and the results of the great problem of popular education cannot be presented in too clear a form, we have added to the tables a certain number of diagrams, which illustrate graphically a series of facts and their relations to one another, and statistical charts showing the mode of grouping the same facts according to territory.

Such is the résumé of data which are laid down in the first volume of the statistics of primary education. They are of such a nature as to give new encouragement to our efforts and to strengthen our hope in the success of the work to which the Republic attaches the highest and most legitimate importance. The Republic, better than any other government, has understood that its first duty is to lift up the democracy. To fulfil this duty it was of importance to know the exact condition of affairs and to fix a starting point which will enable us to measure the progress of the future. This we have done. The appropriations made by the Chambers are a proof of the harmony of the public powers whenever the question of developing primary education is broached. The Universal Exposition has just sanctioned the progress accomplished by our teachers since 1867. The rewards already obtained can only act as a stimulus. We see now what remains to be done. The task is heavy. But public opinion is with those who take an ardent interest in this great cause—the triumph is assured.

REPORT OF THE STATISTICAL COMMISSION.¹

REMARKS.

The statistical commission organized in the section of primary education in the ministry of public instruction has the honor to submit a brief account of its work. As this is the first report, the commission has to state the object for which it has been organized, and it must set forth what means it has employed to accomplish its task.

I. Primary education embraces such a large number of establishments, teachers, and pupils in various circumstances that it is impossible to understand the whole and to form a correct idea of its condition, its wants, its progress, or its deficiencies without the aid of statistics.

This has been understood in France. The governments and the min-

¹MM. E. Levasseur (president), Maurice Block, A. Boutan, O. Gréard, J.-J. Rapet, E. de Resbecq, and F. Buisson.

isters who have taken most interest in primary education are also those who have directed their attention to the preparation of its statistics.

A year after the July revolution M. de Montalivet, minister of public instruction, presented to the King his first report on the condition of primary education, and he proposed the regular publication of triennial statistics.

This proposition was approved and six reports were printed, viz, in 1833, 1834, 1838, 1841, 1845, and in January, 1848. The first two reports had for their author M. Guizot, who had the honor of attaching his name to the fundamental law of primary education in France, and the last one, which had been prepared by M. de Salvandy, was not printed in full in consequence of the events of the year 1848. The republic, however, continued the work; a seventh report was prepared in 1850, but political events again prevented its publication.

Although the administration continued from this period to collect every year statistics for its own use, it did not publish any reports during fourteen years. As soon as M. Duruy had entered the ministry he undertook to prepare complete statistics of primary, secondary, and superior education. The statistics of primary education fill several volumes and present, among other documents, the condition of education on the 1st day of January, 1864, and on the same day in 1867; it is the most extensive work on this subject which has been published in France; it proves in a high degree what zeal this minister has displayed for the advancement of education.

After his departure, complete silence again.

The international statistical congress, held at the Hague in 1869, decided that volumes of comparative statistics, relating each to one of the branches of public affairs or social life, should be prepared under the auspices of the congress by the official statistical bureaus, the directors of which should take upon themselves the responsibility of the work. This is a great enterprise. Only a few volumes have appeared up to the present date, but they are sufficient to indicate the interest such a work must possess for the international study of politics and social science. The statistics of education were assigned to Austria and intrusted to Mr. Ficker, president of the central statistical commission of Austria. This learned gentleman wished to avail himself of the Universal Exhibition of Vienna in 1873 to prepare statistical blanks and to request the different governments to fill them out, so that they might be exhibited at Vienna and be used afterwards for the preparation of international statistics. But the time was too short, and few nations were able to comply with this request. Several states and cities, which had not finished their statistics in 1873, published them later. To this number belongs the city of Paris, which, in 1875, had accurate and complete statistics prepared by M. Gréard.¹ Under the ministry of M. Jules

¹L'instruction primaire à Paris et dans les communes du département de la Seine en 1875, par M. Gréard.

Simón, in 1872, the French government resumed the former practice and prepared educational statistics, which were, however, not considered complete enough to be published. The two official reports published in France after the Vienna Exhibition, by MM. E. Levasseur and F. Buisson, insisted on the necessity of preparing regular educational statistics in France. We find therein the following passage: "It is doubtless not less useful in a civilized country to be able to form an idea of the condition and progress of education than of movements of commerce and the number of sentences for crime. Nevertheless, we have in France every year the latter information, while we do not possess the former."

This was also the opinion of M. Boutan, director of primary education. If good educational statistics are always necessary, they are especially called for under a republican government, which, earnestly concerning itself with the development of education in general and especially of popular education, needs information respecting both details and general features as well as an account of the successive changes in educational affairs, that it may act with safety. It is not only necessary that the administration be enlightened, but that it should enlighten public opinion, and should furnish to the deliberating powers such data as are necessary for the preparation and discussion of reforms. The recent work of the commissions of the Chamber of Deputies will suffice to give a striking proof of this assertion.

On the proposition of the director of primary education, the statistical commission was organized under the ministry of M. Wallon by decree of March 15, 1876, and was composed of MM. Levasseur, member of the Institute, president; Maurice Block, statistician; J.-J. Rapet, honorary inspector general of primary instruction; A. Boutan, director of primary education in the ministry of public instruction; O. Gréard, director of primary education for the department of the Seine; E. de Resbecq, under director of primary education in the ministry; F. Buisson, late inspector of primary schools, secretary.

At the first meeting the director stated in the name of the minister what motives had induced him to appoint the commission. The minister, struck with the inconvenience caused by the publication of disconnected school statistics at long intervals, determined to inquire into the conditions and to lay the basis of permanent statistics of primary education. He invited the commission to present to him, after a careful examination, a summary report on the means to secure gradually a uniform method that would facilitate comparison and insure that certainty in results which public opinion now expects from works of this kind.

Complying with the desire of the administration, the commission immediately commenced the study of this complex question, to which it intended to devote several months, before submitting a report to the minister. A few meetings only had been given to the subject, when the decree announcing the opening of the Universal Exposition at Paris in 1878 compelled the commission to modify the programme of its work.

It became necessary to prepare school statistics without delay, so that their publication might coincide, as much as possible, with the date of the Exposition. This was a new task, more restricted and pressing; it was necessary to take up the practical part without delay and to prepare schedules, introducing in the new schedules only such improvements as the commission considered at once essential and susceptible of immediate realization.

Although precautions were taken to change as little as possible the schedules hitherto used in the annual reports, the commission did not overlook the difficulties which teachers and inspectors would encounter in a work conceived in part on a new basis. And as hurried statistics are liable to be very imperfect, the commission requested the administration to have the way prepared for a complete work by ordering the immediate preparation of a first sketch of statistics for the year 1875-'76. This work was accomplished during the period from August to November, 1876. The result of it was twofold: first, it familiarized the personnel engaged in the work with some of the principal dispositions of the new statistics; and, secondly, it furnished the commission a great many detailed observations made by the inspectors, who indicated the parts which had been best understood, as well as those which needed further explanation, and, finally, those which had to be entirely omitted for the present.

After having collected and discussed the preparatory information, the commission arranged the schedules for the statistics of the school year 1876-'77. These schedules have been submitted to one of your predecessors, and, with his approval, have been used in preparing the present work.

II. The statistics of primary education must, above all, answer the following questions: (1) What, from the standpoint of popular education, are the needs of the country? (2) What measures are taken to supply these needs? (3) What use does the population make of the means of instruction placed at its disposal?

In other words, the statistics must determine the number of children to be educated, the number of schools and classes which are at their disposal, the number of children who take advantage of the means of instruction offered them; and it has to facilitate the comparison of the results. This is the problem to be solved, and such the plan on which the commission proposes to work.

The comparison of these three groups of facts constitutes the principal usefulness of school statistics, and as it shows the true condition of national education at present, it informs the country what it still has to accomplish.

GENERAL RÉSUMÉ OF STATISTICS OF PRIMARY INSTRUCTION FOR THE SCHOOL YEAR 1876-77.

SCHOOL POPULATION.

The total population of France at the last census, December, 1876, was 36,905,788. The number of children between 6 and 13 was 4,502,894 (2,278,295 boys and 2,224,599 girls). There are thus about twelve (12.20) children of school age (6-13) to every 100 inhabitants, or one child to about eight inhabitants (8.19). In rural districts (communes of less than 2,000 inhabitants) the proportion is a little higher than in cities (communes of more than 2,000 inhabitants). In the former the average number of children is 12.67, while in the latter it is only 11.53; but if the rural districts are taken separately the number of the children of school age is more than 12.67 to every 100 inhabitants. In the department of Haute-Savoie it is 15.01, in Nièvre 15.04, in Lozère 15.72, and it exceeds 14 in twelve other departments. The number of boys is larger than that of girls in all but thirteen departments.

MEANS OF EDUCATION OFFERED TO THE POPULATION.

Schools, classes, and teachers.—France possesses 59,021 public schools, 1,746 subsidized private schools used as public communal schools, and 10,780 entirely private schools. There are thus 71,547 public and private primary schools, or one school to 515 inhabitants. Of the 59,021 public schools, 55,879 are ordinary communal schools and 3,142 village schools; 2,456 of the latter are for both sexes and 2,849 directed by lay teachers. Of the 59,021 public schools, 45,816 are under lay and 13,205 under religious teachers (priests, brothers, and sisters), or 78 per cent. are directed by lay and 22 per cent. by religious teachers. Of the 59,021 public schools, 49,669 charge for tuition, and admit only the children of poor parents free; 9,352, or barely 16 per cent., are entirely free. The proportion of free schools under religious teachers is much larger than the proportion among lay teachers: 31 per cent. of the schools under religious teachers are free, while only 19 per cent. of the lay schools instruct gratuitously. The department of the Seine has free schools only; in the department of Bouches-du-Rhône, 296 of the 375 schools are free; in Doubs, 508 out of 932; and in Hérault, 304 out of 574 schools are free.

Of the 59,021 public schools, 23,381 are for boys, 19,257 for girls, and 16,383 for both sexes. Of the subsidized private schools used as public communal schools, 87 are schools for boys, 91 for boys and girls, and 1,568 for girls.

Of the 10,780 entirely private schools, 1,950 are for boys (1,323 under lay and 627 under religious teachers), 8,301 for girls (3,906 under lay and 4,395 under religious teachers), and 529 for both sexes (354 under lay and 175 under religious teachers). Of the 10,780 private schools,

1,528 are free schools. From the foregoing it appears that of all the primary schools in France 82.49 per cent. are public, 2.44 per cent. subsidized private schools used as public communal schools, and 15.07 per cent. entirely private schools. Of the 60,767 public and subsidized private schools, 59,267, or 97.53 per cent., are Catholic; 999, or 1.65 per cent., Protestant; 18, or 0.03 per cent., Jewish; and 483, or 0.79 per cent., undenominational.

The 59,021 public schools have 78,276 classes. The 45,816 lay schools have only 52,993 classes. The 13,205 religious schools have 25,283 classes, or, the lay schools have an average of only one class, while the religious schools have almost two.

Condition of school-houses.—According to a report of 1875-'76, there were 34,108 school-houses where improvements were desirable, and the erection of 17,641 buildings was recommended; 27,958 schools had gardens. There were still 3,543 classes in which the number of pupils exceeded 80.

The teaching corps.—The total number of teachers of public primary schools was 80,063 in August, 1877, 46,400 males and 33,663 females. Of the 46,400 public male teachers, 39,533 are lay and 6,867 religious persons, and of the 33,663 public female teachers, 13,707 are lay and 19,956 religious persons.

France has 78,276 classes and 80,063 teachers in public primary schools. There are thus 1,787 more teachers than classes.

The total number of all public and private teachers in France is 110,709, 51,717 males and 58,992 females. The lay teachers number 64,025, 42,249 males and 21,776 females. The religious teachers number 46,684, 9,468 males and 37,216 females. More than one-half of all the primary school teachers in France are females, but in the public schools alone the proportion of females is only 42 per cent.

Classification of teachers.—The teachers are divided into regular teachers (*instituteurs et institutrices titulaires*) and assistant teachers (*instituteurs et institutrices adjoints*); further, into certificated teachers and uncertificated teachers. Of the 110,709 teachers, 69,095 are regular and 41,614 assistant teachers. Of the 110,709 teachers, 68,997, or 62 per cent., are certificated teachers, and 41,712, or 38 per cent., are uncertificated. Of 37,216 female religious teachers, only 5,733, or 15 per cent., are certificated; of 21,776 female lay teachers, 19,325, or 88 per cent., are certificated; of the 9,468 male religious teachers, 3,768, or 39 per cent., and of the 42,249 male lay teachers, 40,171, or 95 per cent., are certificated.

From the above it results that France has for every 10,000 inhabitants 16 public schools, 21 public classes, 12 public male and 9 public female teachers; of all kinds, there are 19 schools, 29 classes, 14 male and 19 female teachers to every 10,000 inhabitants. In the rural districts there are 23 public schools and 26 classes and in the cities 6 public schools and 14 classes to every 10,000 inhabitants.

As the number of communes in France is 36,056, and the number of communes provided with schools was 35,744 in 1876-'77, there were 312 communes without schools.

The girls' schools are still very defective. Of the 19,559 communes of more than 500 inhabitants which, according to the law of 1867, are bound to establish special schools for girls, there are still 1,878 communes which have not fulfilled this obligation, and 2,296 communes have only private schools.

Infant schools (salles d'asile).—There are infant schools in 3,042 communes. The total number of these institutions was 4,147 in 1877, 2,785 public and 1,362 private; 838 were under lay and 3,309 under religious teachers; 1,908 charge for tuition and 2,239 are free schools.

From the above it appears that there are about 3 infant schools to 1,000 children between 4 and 6. Nine-tenths of these institutions are in the cities. The infant schools are under the control of 6,223 female teachers, 1,176 lay and 5,047 religious. The total number of children in the public and private infant schools is 532,077, 260,159 boys and 271,918 girls.

NUMBER OF PUPILS ON THE ROLLS IN THE DIFFERENT PRIMARY SCHOOLS.

The total number of pupils on the rolls of the public schools for the year 1876-'77 was 3,823,348, 2,197,652 boys and 1,625,696 girls. In the subsidized private schools the number of pupils on the rolls was 142,134, 15,302 boys and 126,832 girls. In the unsubsidized private schools the rolls showed 751,453 pupils, 187,228 boys and 563,595 girls. The total number of children on the rolls of the public and private primary schools was thus 4,716,935, 2,400,882 boys and 2,316,053 girls.

As the school population (6-13) is 4,502,894 according to the last census, there are 214,041 children more on the rolls than the number of children of school age. Nearly one-half of all the children in all the primary schools of France receive gratuitous instruction.

CIRCULARS OF INFORMATION FOR 1881.

SCHOOL ATTENDANCE.

The following table shows the attendance at schools in the different departments of France :

showing the proportion of children in attendance to 10,000 inhabitants in the different departments in the school year 1876-77.

No.	Departments. ¹	Number of pupils to every 10,000 inhabitants.	No.	Departments. ¹	Number of pupils to every 10,000 inhabitants.
1	Savoie	1,398	45	Haute-Loire	997
2	Haute-Savoie	1,298	46	Hautes-Pyrénées	986
3	Doubs	1,295	47	Seine-et Oise	984
4	Hautes-Alpes	1,291	48	Drôme	971
5	Haute-Saône	1,283	49	Calvados	969
6	Lozère	1,273	50	Gard	964
7	Vosges	1,263	51	Ariège	963
8	Jura	1,257	52	Basses-Pyrénées	959
9	Cantal	1,231	53	Cher	957
10	Saône-et-Loire	1,215	54	Aude	953
11	Aveyron	1,209	55	Vienne	948
12	Pas-de-Calais	1,201	56	Corse	947
13	Yonne	1,180	57	Aube	941
14	Haut-Rhin (Belfort)	1,146	58	Tarn	936
15	Nièvre	1,124	59	Mayenne	935
16	Haute-Marne	1,120	60	Puy-de-Dôme	933
17	Côte-d'Or	1,102	61	Haute-Garonne	917
18	Meuse	1,101	62	Indre	915
19	Nord	1,100	63	Maine-et-Loire	905
20	Ardennes	1,095	64	Tarn-et-Garonne	904
21	Seine-Inférieure	1,094	65	Bouches-du-Rhône	903
22	Oise	1,093	66	Côtes-du-Nord	902
23	Isère	1,093	67	Rhône	895
24	Meurthe-et-Moselle	1,082	68	Vaucluse	893
25	Ain	1,077	69	Loire-Inférieure	889
26	Vendée	1,073	70	Orne	881
27	Hérault	1,068	71	Corrèze	870
28	Allier	1,068	72	Gironde	869
29	Loiret	1,044	73	Alpes-Maritimes	865
30	Creuse	1,040	74	Sarthe	845
31	Loire	1,038	75	Gers	839
32	Aisne	1,032	76	Eure	826
33	Lot	1,031	77	Dordogne	824
34	Seine-et-Marne	1,027	78	Lot-et-Garonne	817
35	Deux-Sèvres	1,024	79	Indre-et-Loire	816
36	Pyrénées-Orientales	1,023	80	Charente	806
37	Marne	1,011	81	Var	804
38	Ile-et-Vilaine	1,009	82	Landes	796
39	Somme	1,008	83	Haute-Vienne	795
40	Loir-et-Cher	1,007	84	Charente-Inférieure	787
41	Eure-et-Loir	1,007	85	Seine	785
42	Manche	1,005	86	Finistère	757
43	Basses-Alpes	1,005	87	Morbihan	751
44	Ardèche	1,004			

¹ In this list the departments are arranged according to the highest number of pupils

ADULT SCHOOLS.

In 1876-'77 there were 22,133 courses for men and 5,284 for women. There were, besides, 423 musical courses, giving instruction to 10,958 men and 491 women. The number of men attending the adult schools was 500,043, and the number of women 105,510.

Of these adult pupils, 8,079 men and 2,120 women left the schools absolutely illiterate; 10,275 men and 3,424 women learned to read and 10,813 men and 3,161 women learned to read and write. All the other pupils increased their elementary knowledge, either in language, arithmetic, history, or geography.

The courses of drawing were attended by 21,547 men and 566 women, the courses of geometry and surveying by 76,627 men and 574 women, the courses of book-keeping and commercial arithmetic by 36,295 men and 2,685 women, the courses of physical sciences by 8,428 men and 368 women, the courses of history and geography by 91,869 men and 8,645 women.

SCHOOL LIBRARIES.

In 1877 there were 19,234 communal school libraries in France, with 1,943,688 volumes. Their income from various sources amounted to 245,069 francs (\$47,298) in 1877. During the year these libraries circulated 1,337,156 volumes, many of these, however, being text books lent to indigent pupils in the public schools.

PROFESSIONAL TRAINING OF TEACHERS.

In 1877 France had 79 normal schools for men. Of this number, 65 date from the organization period of 1830-1837 and 14 have been established from 1849 to 1875. These 79 institutions had, in 1877, 79 directors, 847 professors and assistants, and 3,587 pupils in 3 years' courses. The annual cost per pupil amounts to about 575 francs.

The number of normal schools for women was 18 in 1877. Of this number 9 have been founded since 1872. The 18 institutions had, in 1877, 18 lady principals, 121 teachers, and 715 pupils.

There were 62 normal courses for female candidates in 1877. The number of pupils was 1,385. There is no provision in the school laws relative to normal courses; they are attached to private schools and prepare for the examinations for diplomas of capacity. The course of study lasts ordinarily two years. For male candidates there are very few normal courses, of which there are 5 for Protestants. The normal courses are generally subsidized by the state or department, or by both.

In 1875, of the 1,001 male candidates presented for examination 952 received diplomas; in 1876, 968 out of 1,035; and in 1877, 1,084 out of 1,091. The female candidates presented in 1876 numbered 154 and in 1877 186, all of whom received diplomas.

COST OF PRIMARY EDUCATION.

The ordinary and extraordinary expenditure in 1876 amounted to 83,078,734 francs, which is 2.25 francs per capita of the whole population and 21.50 francs a year per pupil.

II.

Following is an abstract of the report on primary instruction from 1829 to 1877,¹ the introduction being an extract from the letter of M. Jules Ferry, minister of public instruction, to the President of the Republic :

INTRODUCTION.

MONSIEUR LE PRÉSIDENT: By creating in the ministry of public instruction a permanent commission of primary school statistics my honorable predecessor, M. Waddington, sought to give to the unprecedented educational movement which has manifested itself during the last nine years, both in the Chambers and in the nation, the benefits of a precise, methodical, sincere, and scientific investigation, showing at regular intervals the progress achieved and indicating what has still to be accomplished.

This commission, composed of the most competent men and headed by M. Levasseur, of the Institute, a distinguished economist and statistician, published in 1878 the statistics of primary education for the year 1876-77. This remarkable document is to serve as the type of future statistics.

The commission wanted at the same time to make a survey of the past by summarizing the data of numerous statistics published by the ministry of public instruction. The first official report bears the date of 1829; the first statistics of both boys' and girls' schools were only published in 1837. We are thus enabled to see what has been accomplished in 40 years at least. This work, covering nearly half a century, is immense.

From 1837 to 1877 the number of pupils of primary schools has increased 70 per cent., there being 752 pupils for every 10,000 inhabitants in 1837 and 1,281 pupils in 1877. The total number of schools has increased 36 per cent.; the public schools alone, 75 per cent. The number of girls' schools has increased fourfold in the same period. In 1837 France had 5,667 communes without any school; in 1877 this number had been reduced to 312, and in 1879 to 298. In 1827, 42 per cent. of the conscripts could read; in 1877, this number had risen to 85. In 1820 only 34 per cent. of the women were able to sign their marriage contracts; at present 70 per cent. are able to sign. From 1871 to 1877 the ordinary expenses for primary schools have increased 34 per cent. The state grant, which was 8,620,000 francs in 1871, has reached 15,647,000 francs in 1878, and in 1880 it amounts to about 20,000,000 francs. The communal expenses for primary schools increased 44 per cent. from 1871 to 1877, and the departmental expenses 47 per cent. in the same period. These figures show a good will and a patriotism without precedent in our history.

¹ Statistique de l'enseignement primaire. Tome second. Statistique comparée de l'enseignement primaire. (1829-1877.) Paris, 1880.

REPORT OF THE STATISTICAL COMMISSION.

STATISTICAL REPORTS.

The first statistics of primary education in France date from the restoration.

Before this period the *Almanach de l'Université de France* sometimes published the number of institutions of learning and the number of pupils by departments or academies. The *Manuel Général*, the official journal of public instruction, also published some figures, as, for example, the proportion of pupils to the population in 1817, 1820, 1825, 1829, and 1833; but these data are too summary to be accepted as trustworthy statistics.

In 1826, Baron Charles Dupin published a chart illustrating the condition of popular education in France. This chart was the object of lively discussion; it is worth consulting, but it has not the value of an official document.

The first official statement concerning the condition of primary education in France was published in 1831 by M. de Montalivet, minister of public instruction. Under the ministry of M. Guizot, several reports were published; the most remarkable is that of 1834. Then follow the reports of M. Villemain for 1841 and 1843, and that of M. Salvandy for 1847. A later report for 1850, published in December, 1852, is incorrect. Then came several elaborate works published by M. Duruy in 1862, 1864, 1868, and 1869. After the year 1869, the publication of statistics of primary education was again interrupted. During the ministry of M. Jules Simon, a statistical report was prepared and even printed in 1873, but as it was found to be defective in some points it was withheld from the public. In March, 1876, a statistical commission was created, to which we owe the two volumes from which the present abstract has been prepared.

SCHOOL POPULATION.

The following table shows the total population of France and the number of children between 5 and 15, from 1821 to 1876:

Years.	Total population.	Children between 5 and 15.
1821	30,461,875	.....
1831	32,569,223	.....
1836	33,540,910	.....
1851	35,783,059	6,443,548
1861	37,382,225	6,508,179
1866	38,067,064	6,529,271
1876	36,905,788	6,409,087

NUMBER OF COMMUNES AND SCHOOLS FROM 1821 TO 1876-77.

In 1821 France had, according to the *Almanach de l'Université*, 28,236 primary schools. In 1829 the number of communes was 38,135 and the total number of primary schools for boys 30,536. In 1834 the number of communes was 37,187 and the number of primary schools 33,695, 22,641 public and 11,054 private. In 1837 the number of communes was 37,234 and the number of primary schools 52,779, 34,756 public and 18,023 private. In 1850 the number of communes was 36,786 and the number of primary schools 60,579, 43,843 public and 16,736 private. In 1863 the number of communes was 37,510 and the number of primary schools 68,761, 52,445 public and 16,316 private. In 1876-77 the number of communes was 36,056 and the number of primary schools 71,547, 60,767 public and 10,780 private.

In 1837, 5,667, or 15.2 per cent. of the communes, had no school; in 1847, 3,213, or 8.7 per cent; in 1850, 2,690, or 7.3 per cent.; in 1861, 1,018, or 2.7 per cent.; in 1863, 818, or 2.2 per cent.; in 1865, 694, or 1.8 per cent.; in 1866, 650, or 1.7 per cent.; in 1876-77, 312, or 0.9 per cent. In 1837 France had one school for 127 children between 5 and 15, or 78.8 schools for 10,000 children; in 1877 she had one school for 89.6 children between 5 and 15, or 111.6 schools for 10,000 children. Of the 71,547 schools in 1876-77, 42,421 were for boys and 29,126 for girls. In 1832 there were only 10,672 schools for girls against 31,420 for boys.

In 1837, 21,695 communes, or 58.3 per cent. of the total number of communes in France, had no public schools for girls; in 1863 there were still 18,174 such communes, or 48.5 per cent., and in 1876-77, 16,380 such communes, or 45.4 per cent. One-fourth of these communes had a population of less than 500.

The following table shows the movement of lay schools and religious schools (*écoles congréganistes*):

Years.	Lay schools.				
	Total.	Public.		Private.	
		For boys.	For girls.	For boys.	For girls.
1843	52,225	34,063	4,032	7,371	6,759
1850	50,267	33,201	4,178	4,563	8,325
1863	51,555	35,348	5,998	2,572	7,637
1865	51,806	35,560	6,399	2,864	6,983
1866	52,366	35,774	6,569	2,944	7,079
1872	51,633	35,774	8,479	2,088	5,292
1875	51,722	36,497	9,229	1,760	4,236
1876-77	51,657	36,399	9,417	1,750	4,091

Years.	Religious schools.				
	Total.	Public.		Private.	
		For boys.	For girls.	For boys.	For girls.
1843	7,613	827	3,798	290	2,698
1850	10,312	1,227	5,237	399	3,449
1863	17,206	3,038	8,061	536	5,571
1865	17,893	3,069	8,322	646	5,856
1866	18,305	3,084	8,530	655	6,036
1872	18,546	3,078	8,982	780	5,706
1875	19,968	3,518	11,131	843	4,476
1876-77	19,890	3,365	9,840	907	5,778

TEACHERS.

The following table shows the number of male and female lay and religious teachers:

Years.	Total number of teachers.	Lay teachers.			Religious teachers.		
		Total.	Male.	Female.	Total.	Male.	Female.
1837	59,735	48,667	37,371	11,296	11,068	1,931	9,137
1840	63,409	50,802	38,368	12,434	12,607	2,136	10,471
1843	75,535	58,577	44,173	14,404	16,958	3,128	13,830
1863	108,799	61,826	40,817	21,009	46,973	8,768	38,205
1872	110,238	63,158	41,208	21,950	47,080	9,341	37,739
1876-77	110,709	64,025	42,249	21,776	46,684	9,468	37,216

Of the 59,735 teachers in 1837, 38,465 were public and 21,270 private school teachers; of the 110,709 teachers in 1876-77, 80,063 were public and 30,646 private.

NORMAL SCHOOLS.

In 1833 France had 62 normal schools for men, with 1,944 pupils; in 1863 there were 76 schools, with 3,139 pupils; and in 1876-77, 78 schools, with 3,551 pupils. For females, there were 6 normal schools in 1843; 10 schools, with 334 scholars, in 1850; 11 schools, with 440 pupils, in 1863; and 17 schools, with 691 pupils, in 1876-77.

A law was passed August 9, 1879, which requires the establishment of a female normal school in each of the 87 departments.

The expenditures for the normal schools have been as follows: For male normal schools, in 1850, 1,903,547 francs; in 1876-77, 3,393,420 francs. For female normal schools, in 1850, 124,091 francs; in 1876-77, 508,702 francs.

TEACHERS' MUTUAL AID SOCIETIES.

All the departments except 9 have teachers' aid societies. The first teachers' mutual aid society was established in the department of Yonne in 1844, the second in the department of the Seine in 1846. In 1863 only 18 departments had mutual aid societies; the remaining 55 have been established from 1863 to 1870. The minimum of the annual fee is 5 francs, the maximum 24 francs. On the 1st of January, 1879, the capital of these societies amounted to 2,374,340 francs.

PUPILS.

The following table shows the number of pupils from 1829 to 1876-'77 :

Years.	Number of pupils.			Number of pupils in public schools.	Number of pupils in private schools.	Number of pupils in lay schools.	Number of pupils in ous schools.
	Total.	Boys.	Girls.				
1829.....	1,357,934	969,340	388,594				
1832.....	1,937,582	1,202,673	734,909				
1833.....	1,654,828			1,289,230	365,598		
1837.....	2,690,035	1,579,888	1,110,147	2,046,455	643,580		
1840.....	2,896,934	1,656,662	1,240,272	2,216,767	680,167		
1843.....	3,164,297	1,812,709	1,351,588	2,407,425	756,872	2,457,380	706,917
1847.....	3,530,135	2,176,079	1,354,056				
1850.....	3,322,423	1,793,667	1,528,756	2,601,619	720,804	2,368,627	953,796
1851.....	4,286,641					2,744,667	1,541,974
1863.....	4,336,368	2,265,756	2,070,612	3,413,830	922,538	2,725,694	1,610,674
1865.....	4,436,470	2,306,792	2,129,678	3,477,542	958,928	2,763,524	1,672,946
1866.....	4,515,967	2,343,781	2,172,186	3,537,709	978,258	2,820,670	1,695,297
1872.....	4,722,754	2,445,216	2,277,538	3,835,991	886,763		
1875.....	4,809,728	2,450,683	2,359,045	4,049,953	759,775	2,938,709	1,871,019
1876-'77...	4,716,935	2,400,882	2,316,053	3,823,348	893,587	2,648,562	2,068,373

SALLES D'ASILE.

The salles d'asile (infant schools) are especially for children of the working people, whose occupations call them away from home during the day. They have been considerably improved during the last few years, so that they are now giving a good preparation for the primary school.

In 1837 there were only 251 salles d'asile, with 29,514 pupils, while in 1876-'77 there were 4,147, with 532,077.

ADULT SCHOOLS.

The French adult schools date from the first years of the eighteenth century. In 1863 there were 5,168 courses for adults: 4,986 for men and 182 for women. In 1876 the number was 27,417: 22,133 for men

and 5,284 for women. The number of pupils in 1863 was 125,647: 115,673 men and 9,974 women; in 1876-'77 the number was 605,763: 500,053 men and 105,710 women.

SCHOOL LIBRARIES.

School libraries are increasing very rapidly in France. In 1863 they numbered 8,356, with 684,344 books; in 1869 they numbered 14,395, with 1,239,165 volumes; in 1872, 14,679, with 1,349,712 volumes; in 1876-'77, 19,234, with 1,943,688 volumes; in January, 1879, 20,552, with 2,051,227 volumes; in 1880, 20,781, with 2,326,302 volumes. The pedagogic libraries numbered 1,725 in 1880, and the number of volumes, 113,997.

SCHOOL SAVINGS BANKS.

The school savings banks are not directly established by the school authorities, but they owe their origin to the initiative of the teachers and scholars. The first one dates as far back as the year 1834, and they are now found in 81 of the 87 departments. The total number of school savings banks was 10,440 in 1879, and the number of depositors 224,280. The total amount deposited was 3,602,621 francs. In 1876 there were only 8,033 school savings banks in 60 departments. The number of depositors in the same year was 177,040, and the amount deposited, 2,984,352. The progress made in 1877 and 1878 is thus very remarkable.

The French minister of public instruction has charged an eminent economist, M. de Malarce, with the task of studying the questions relating to popular and school savings banks in different countries. M. de Malarce has published the results of his investigation in a pamphlet entitled "*Manuel des caisses d'épargne scolaires en France*" (*Manual of School Savings Banks in France*), Paris, 1879, of which the following is an abstract:

Historical sketch.—According to a recent report of the English post-office department, several European and American governments are at present improving their savings banks. They endeavor to derive benefit from the experience of other countries. We may add that the people, too, take great interest in this movement. In France, at least, both in Paris and the provinces, the people appreciate this public service very highly. We have received many ingenious suggestions from employers, laborers, directors of savings banks, and school teachers. They also ask us questions which will be answered here, in order that our replies may be accessible to many readers.

We are asked how penny banks can be established, and how these banks can be introduced into the school. We are further asked: Why should an institution fail in France which has succeeded so well in England and Belgium? Are our pupils not as intelligent as English or Belgian pupils, and are our teachers less capable and less devoted than their colleagues in other countries? Would it not be sufficient to

inform us what is going on at Ghent, Brussels, London, Glasgow, &c. † Did we not introduce into France the general savings banks in 1848, the *salles d'asile* in 1825, and several other useful institutions which our neighbors had established before us?

The establishment of school savings banks is originally a French idea. If the first penny bank was established at Greenock, in 1837; if school savings banks have been tried at Verona (Italy), in 1844, in Saxe-Weimar and Württemberg in 1846, in Prussia and Switzerland in 1851, in Hungary in 1860, in Belgium in 1839 and 1840, we are able to state that France has had a school savings bank since 1834. M. Dulac, a teacher of Mans, has had a savings bank in his school from May 4, 1834, to 1870. From 1836 to 1840 attempts to establish school savings banks were made at Amiens, Grenoble, Lyons, Paris, &c. In 1840 M. Rapet established a school savings bank at Périgueux.

The following is an account of the method employed by M. F. Laurent, the founder of school savings banks in Belgium:

In the fall of 1866, towards the close of the midsummer holidays, M. Laurent, professor of civil law at the University of Ghent, called a meeting of some of the directors of the city schools. He said that saving must be taught, like any other virtue, by causing it to be practised. Children are the best agents of social reform. The future laborers must learn the great importance of small savings. While small savings are of great value to all the children, they are especially so to the children of the poor, who see more pennies than larger coins, and for whom the habit of saving will be the only means of success in later years.

M. Laurent thoroughly explained his plan to the directors, and then went from school to school to give the children lessons of economy. In October, 1866, two communal schools of Ghent had each a savings bank, and, thanks to the encouragement on the part of the communal council, the city school commission, and two liberal societies, savings banks have been introduced into all the city schools. Of the 45,000 pupils of these schools more than 13,000 have deposits exceeding one franc.

From Ghent the savings banks spread over the whole country, and they were later introduced in Germany, Holland, England, and Italy. The following method was employed in France by M. de Malarce:

After having made arrangements with the nearest savings bank, the director of the school informs his pupils that he is ready to receive their small savings (the amount of a single deposit must not exceed 5 francs, as larger deposits would be incompatible with the name of penny bank), and that as soon as the deposits amount to 1 franc he will transfer them to the regular savings bank and the scholar will receive a bank book.

The director fixes a day when, in each week, at the beginning of the school, deposits will be received. He has before him a register of the school savings bank, in which he enters the names of depositors and

the amounts deposited. Each pupil keeps a duplicate account on a single sheet of paper, with sufficient columns for the whole school year. Sometimes the register and the blanks for duplicate accounts are furnished free of charge by the savings banks, and in some cases the teachers have them prepared by the pupils themselves, as this is an excellent exercise in writing and simple book-keeping.

This is the simple process, so far as the school room is concerned. The transactions outside the school room—the relations with the savings banks—are also very simple. At the beginning of every month the teacher adds up the deposits of every pupil, and in case they exceed 1 franc he deposits the even francs at the savings bank and keeps the amounts of less than 1 franc on the register of the school savings bank.

The bank books of the depositors are kept by the teacher as long as the pupils attend school. When a pupil leaves the school the book is handed over to his parents or guardians.

No pupil can withdraw a part or the whole of his deposit without the consent of his parents or guardians.

Legislation.—On the 4th of May, 1879, the Dutch government laid before the States General two projects of law tending to improve the system of savings banks and to place them within reach of the working classes. The first project favors the gratuitous transmission of deposits to the savings banks through the royal post offices; the second project, however, favors the establishment of a national savings bank and authorizes all the post offices of the country to receive deposits.

In 1860 Mr. Gladstone urged the establishment of a national savings bank in connection with the post offices. This idea was not new, however; it dated from 1807, when Mr. Whitbread, M. P., advocated, in an amendment to the poor law, the establishment of post office savings banks. Mr. Gladstone's plan was carried out by the act of May 27, 1861.

In 1874 Mr. Sella, together with several of his colleagues in the Italian Parliament, submitted a plan for the establishment of post office savings banks, and their project became law May 26, 1875.

In France, by a single act of our legislature, the many post offices would give our country over 12,000 savings banks. This large number of banks would help to increase the number of school savings banks. Hitherto many teachers have hesitated to introduce the system in their schools, because they have no savings banks near by in which to deposit the savings of their pupils.

From 1874 to 1879 more than 12,000 school savings banks have been established in France, and 57,000 more could be established in the near future if the post office savings banks were introduced into France.

France has at present 59,000 communal schools and 10,780 private primary schools.

Table showing number of depositors in several European countries.

Countries.	No. of depositors in savings banks.	Population.
Saxony	794,243	2,700,000
Switzerland	600,000	2,700,000
Denmark	382,747	1,900,000
Holland	123,043	3,899,527
Sweden	645,041	4,500,000
Great Britain	3,408,481	34,400,000
Prussia	2,500,528	25,700,000
France	3,100,000	37,000,000
Austria (proper)	1,423,926	20,000,000

RESULTS OF THE PRIMARY SCHOOL SYSTEM.

Average attendance.—The following table shows the average attendance in primary schools in different years from 1829 to 1876-'77:

Years.	Average attendance.		Attendance in summer on each 100 pupils present in winter.
	In winter.	In summer.	
1829	1,357,934	701,459	52
1832	1,937,582	1,114,079	57
1834	1,654,828	792,741	48
1837	2,690,035	1,531,888	57
1840	2,896,934	1,683,296	58
1843	3,164,297	1,966,694	62
1850	3,322,423	2,166,929	65
1863			
1876-'77	4,716,935	3,745,823	79

Certificates of study.—The certificates of primary education are given to pupils who, at the close of their regular course, present themselves for final examination. The following table shows how many pupils have presented themselves for examination and how many have been successful from 1872 to 1878:

Years.	No. of pupils presenting themselves for primary education certificates.		Number of pupils who have obtained certificates.		
	Boys.	Girls.	Boys.	Girls.	Total.
1872	5,146	2,447	3,572	1,586	5,158
1873	12,861	5,221	7,254	2,617	9,871
1874	16,849	6,289	11,380	4,190	15,570
1875	23,169	8,571	15,457	6,293	21,750
1876	29,315	9,813	19,271	6,884	26,155
1877	40,467	15,099	26,057	10,784	36,841
1878	43,148	18,735	27,948	12,589	40,537

Education of conscripts.—The following table shows the number of conscripts who were at least able to read:

Periods.	Percentage of conscripts who were at least able to read.
1827 to 1829.....	44.8
1831 to 1835.....	52.6
1836 to 1840.....	56.3
1841 to 1845.....	60
1846 to 1850.....	64
1851 to 1855.....	65.9
1856 to 1860.....	68.9
1861 to 1865.....	73
1866 to 1868.....	78.6
1871 to 1875.....	82.1
1876 to 1877.....	84.4

General illiteracy.—The following table shows the number of illiterates according to the census of 1866:

Population in 1866.	Number of individuals.	Percentage of the same class.	Number of individuals.	Percentage of the total population.
Unable to read or write.....			14,847,803	39
Under 5 years of age.....	<div> <div>Males.....</div> <div>Females ..</div> </div>	<div> <div>1,881,853</div> <div>1,833,815</div> </div>	<div> <div>12.7</div> <div>12.3</div> </div>	
Total	3,715,668			
Over 5 years of age.....	<div> <div>Males.....</div> <div>Females ..</div> </div>	<div> <div>4,865,324</div> <div>6,266,811</div> </div>	<div> <div>32.9</div> <div>42.1</div> </div>	
Total	11,132,135			
Could read only			3,886,324	10.2
Males	1,644,516	42.3		
Females	2,241,808	57.7		
Could read and write			18,878,380	49.6
Males	10,401,174	55.1		
Females	8,477,206	44.9		
Number of individuals whose education could not be ascertained..			454,557	1.2
Total population			38,067,064	100

The following table shows the number of illiterates according to the census of 1872 :

Population in 1872.		Number of individuals.	Percentage of the same class.	Number of individuals.	Percentage of the total population.
Unable to read or write				13,324,801	36.9
Under 6 years of age	{ Males	1,787,268	13.4		
	{ Females	1,752,833	13.2		
Total		3,540,101			
From 6 to 20 years of age	{ Males	989,342	7.4		
	{ Females	1,092,996	8.2		
Total		2,082,338			
Twenty years and over	{ Males	3,340,740	25.1		
	{ Females	4,361,622	32.7		
Total		7,702,362			
Could read only				3,772,603	10.5
Under 6 years of age	{ Males	148,954	3.9		
	{ Females	143,394	3.8		
Total		292,348			
From 6 to 20 years of age	{ Males	536,469	14.3		
	{ Females	638,656	16.6		
Total		1,175,125			
Twenty years and over	{ Males	918,037	24.6		
	{ Females	1,387,093	36.8		
Total		2,305,130			
Could read and write				18,682,749	51.7
Under 6 years of age	{ Males	80,345	.4		
	{ Females	71,250	.3		
Total		151,595			
From 6 to 20 years of age	{ Males	2,884,896	15.5		
	{ Females	2,573,201	13.8		
Total		5,458,097			
Twenty years and over	{ Males	7,129,376	38.2		
	{ Females	5,943,681	31.8		
Total		13,073,057			
Number of individuals whose education could not be ascertained ..				322,768	.9
Total population				36,102,921	100

Education and crime.—The criminal court statistics have served as a means of ascertaining the condition of primary education, but the in-

formation derived from that source has sometimes led to false conclusions concerning the influence of education upon morals. The causes which lead man to crime are so complex that it is impossible to draw any reliable conclusion from the comparison between literates and criminals and between literate and illiterate criminals. If ignorance and vulgarity push man toward crime; violent passions, the vices of human nature, and the temptations arising from the accumulation of wealth or the agglomeration of population exert, in certain cases, a still greater influence. When we study the French criminal statistics by departments we find that crimes against the person are especially numerous in the southern sections and crimes against property especially frequent in the wealthy regions, and one is led to attribute the frequent occurrence of the former crimes to the violence of the passions and that of the latter crimes to the temptations of wealth.

The judiciary statistics furnish, however, some indications which must not be undervalued. Criminals are recruited to a large extent from the lower strata of society. If primary education were sufficiently spread it would have penetrated those lower quarters, and all criminals, like the rest of the population, would at least be able to read and write.

The following table, which has been furnished by M. Yvernès, chief of the division of statistics in the ministry of justice, shows the percentage of literate and illiterate criminals from 1828 to 1878:

Years.	Of 100 criminals—		
	Were illiterate.	Could read and write or at least read.	Had received a higher education.
1828 to 1830.....	61	37	2
1831 to 1835.....	58	39	3
1836 to 1840.....	57	40	3
1841 to 1845.....	52	45	3
1846 to 1850.....	51	46	3
1851 to 1855.....	46	50	4
1856 to 1860.....	43	52	5
1861 to 1865.....	39	56	5
1866 to 1870.....	37	59	4
1871 to 1875.....	36	61	3
1876 to 1878.....	31	65	4

It is certain, then, that the number of criminals destitute of all education is diminishing, and that, consequently, the number of literate criminals is increasing. This is a necessary consequence of the general diffusion of education in France. If education were spread, as is to be desired, all Frenchmen would at least be able to read and write and all French criminals could be counted as literates.

Education as shown by marriage statistics.—The following tables show the degree of education at different periods of persons who contracted marriage:

Periods.	Percentage of persons who were able to sign their marriage contracts.		
	Men.	Women.	Both sexes.
1854 to 1855.....	68.4	52.6	60.5
1856 to 1860.....	74.1	53.9	61.6
1861 to 1865.....	71.8	57.5	64.6
1866 to 1870.....	75	62.3	68.6
1871 to 1875.....	77.8	66.3	72.7
1876 to 1877.....	81.2	70.6	75.8

Gutter children in Paris.—From a report recently furnished to the prefect of the Seine by the Bureau de l'assistance publique, it appears that, during the year 1880, 1,672 children deserted by their guardians or having no home were brought up by the police, of whom 1,033 were charged with being beggars and vagabonds; and of this number 80 were girls. It is significant that only 124 were given up to their parents and friends. Out of 219,000 children between 6 and 14 years of age living in Paris, there are about 7,000 who attend no school. The report concludes with the statement that each year 600 children are sent into the provinces and placed with different employers, who give them elementary instruction and teach them a trade.

SCHOOL FINANCES.

The following table shows the ordinary expenditure for public primary schools in different years from 1833 to 1877:

Years.	Francs.	Years.	Francs.	Years.	Francs.
1833.....	10,545,576	1860.....	28,134,856	1869.....	49,565,496
1837.....	9,072,646	1861.....	29,343,164	1870.....	53,707,648
1840.....	9,884,421	1862.....	30,099,610	1871.....	53,622,425
1850.....	12,307,077	1863.....	32,423,823	1872.....	56,189,102
1855.....	25,614,950	1864.....	34,285,132	1873.....	60,025,039
1856.....	26,452,858	1865.....	34,556,493	1874.....	61,927,045
1857.....	27,663,325	1866.....	35,053,287	1875.....	63,789,088
1858.....	27,304,597	1867.....	33,849,717	1876.....	68,150,621
1859.....	27,683,045	1868.....	48,913,533	1877.....	71,715,687

The following table shows the resources devoted to the ordinary expenditure for primary schools from 1855 to 1877:

Years.	Francs.	Years.	Francs.	Years.	Francs.
<i>I. Donations and endowments.</i>		<i>I. Donations and endowments.</i>		<i>I. Donations and endowments.</i>	
1855.....	169,958	1863.....	300,509	1871.....	927,803
1856.....	179,122	1864.....	316,844	1872.....	940,868
1857.....	189,904	1865.....	349,697	1873.....	967,501
1858.....	215,575	1866.....	339,170	1874.....	1,006,268
1859.....	214,073	1867.....	376,816	1875.....	1,049,446
1860.....	229,305	1868.....	699,752	1876.....	949,516
1861.....	262,810	1869.....	739,979	1877.....	997,837
1862.....	265,683	1870.....	897,166		
Years.	Francs.	Years.	Francs.	Years.	Francs.
<i>II. Communal taxation.</i>		<i>II. Communal taxation.</i>		<i>II. Communal taxation.</i>	
1855.....	9,916,820	1863.....	12,297,733	1871.....	21,952,334
1856.....	10,459,263	1864.....	13,508,494	1872.....	23,110,316
1857.....	11,237,970	1865.....	13,487,708	1873.....	25,931,237
1858.....	10,736,383	1866.....	13,735,274	1874.....	27,542,787
1859.....	10,730,321	1867.....	12,320,222	1875.....	28,735,862
1860.....	10,696,475	1868.....	19,319,385	1876.....	30,995,314
1861.....	11,142,213	1869.....	18,127,144	1877.....	31,660,365
1862.....	11,537,885	1870.....	22,389,204		
Years.	Francs.	Years.	Francs.	Years.	Francs.
<i>III. School fees.</i>		<i>III. School fees.</i>		<i>III. School fees.</i>	
1850.....	8,745,408	1862.....	13,281,905	1870.....	18,536,708
1855.....	9,090,981	1863.....	14,428,370	1871.....	16,624,906
1856.....	9,356,132	1864.....	14,927,225	1872.....	17,539,895
1857.....	9,845,576	1865.....	15,151,786	1873.....	17,789,767
1858.....	10,202,980	1866.....	15,077,088	1874.....	17,972,015
1859.....	10,964,440	1867.....	14,775,023	1875.....	18,452,678
1860.....	11,887,681	1868.....	18,623,057	1876.....	18,857,886
1861.....	12,709,211	1869.....	19,169,477	1877.....	18,825,372
Years.	Francs.	Years.	Francs.	Years.	Francs.
<i>IV. Departmental grants.</i>		<i>IV. Departmental grants.</i>		<i>IV. Departmental grants.</i>	
1855.....	3,363,029	1863.....	2,840,912	1871.....	5,496,935
1856.....	3,370,951	1864.....	2,822,904	1872.....	5,548,922
1857.....	3,293,043	1865.....	2,835,671	1873.....	5,651,352
1858.....	3,177,698	1866.....	2,843,323	1874.....	5,681,942
1859.....	3,021,805	1867.....	2,868,544	1875.....	5,844,527
1860.....	2,959,123	1868.....	4,833,089	1876.....	6,842,642
1861.....	2,959,402	1869.....	4,944,320	1877.....	8,081,347
1862.....	2,889,758	1870.....	5,205,101		

Years.	Francs.	Years.	Francs.	Years.	Francs.
<i>V. State grants.</i>		<i>V. State grants.</i>		<i>V. State grants.</i>	
1855.....	3,074,161	1863.....	2,556,299	1871.....	8,620,447
1856.....	3,087,390	1864.....	2,709,664	1872.....	9,049,101
1857.....	3,096,832	1865.....	2,731,630	1873.....	9,685,182
1858.....	2,971,961	1866.....	3,058,433	1874.....	9,724,033
1859.....	2,752,406	1867.....	3,509,111	1875.....	9,706,575
1860.....	2,362,272	1868.....	5,438,251	1876.....	10,505,261
1861.....	2,269,528	1869.....	6,584,576	1877.....	12,150,765
1862.....	2,124,379	1870.....	6,679,470		

The following table shows the total ordinary and extraordinary expenditure of communes, departments, and the state for primary education:

Years.	Francs.	Years.	Francs.	Years.	Francs.
1855.....	29,594,531	1863.....	38,758,335	1871.....	61,991,508
1856.....	30,626,789	1864.....	40,599,085	1872.....	67,761,207
1857.....	32,049,456	1865.....	41,286,393	1873.....	72,846,290
1858.....	32,165,652	1866.....	41,650,392	1874.....	76,125,323
1859.....	33,271,209	1867.....	40,367,514	1875.....	77,687,531
1860.....	34,063,912	1868.....	57,427,083	1876.....	83,329,737
1861.....	35,336,074	1869.....	57,998,048	1877.....	89,659,690
1862.....	36,976,384	1870.....	61,640,894		

The following table shows the total expenses for primary instruction from 1855 to 1877:

Years.	Communal.	Departmental.	State.	Total.
	<i>Francs.</i>	<i>Francs.</i>	<i>Francs.</i>	<i>Francs.</i>
1855.....	19,177,759	5,412,867	5,003,905	29,594,531
1856.....	19,994,518	5,462,674	5,169,595	30,626,789
1857.....	21,273,450	5,506,031	5,269,975	32,049,456
1858.....	21,154,938	5,725,717	5,284,997	32,165,652
1859.....	21,908,834	5,907,064	5,455,311	33,271,209
1860.....	22,813,461	5,826,415	5,424,036	34,063,912
1861.....	24,114,234	5,904,976	5,316,834	35,336,074
1862.....	25,085,473	6,469,743	5,421,168	36,976,384
1863.....	27,026,612	6,261,741	5,469,982	38,758,335
1864.....	28,752,563	6,366,600	5,479,925	40,599,085
1865.....	28,989,192	6,503,034	5,794,167	41,286,393
1866.....	29,151,532	6,625,247	5,873,613	41,650,392
1867.....	27,472,062	6,688,837	6,206,615	40,367,514
1868.....	38,642,194	9,646,020	9,138,869	57,427,083
1869.....	38,036,600	10,143,935	9,817,513	57,998,048
1870.....	41,823,077	9,258,506	10,559,310	61,640,894
1871.....	39,505,043	10,131,545	12,354,921	61,991,508
1872.....	41,591,079	10,822,856	15,347,273	67,761,207
1873.....	44,688,505	12,292,657	15,865,128	72,846,290
1874.....	46,521,070	13,238,353	16,635,900	76,125,323
1875.....	48,237,986	13,097,513	16,352,032	77,687,531
1876.....	50,802,717	14,632,444	17,894,575	83,329,737
1877.....	51,483,575	16,140,355	22,035,760	89,659,690

Expenditure for every pupil and inhabitant.—In 1863 the expenditure for every pupil in the primary school amounted to 9.47 francs; in 1876 it amounted to 17.83 francs. The total expenditure compared with the total population shows that the expenditure for every inhabitant of France amounted to 82 centimes in 1855, to 1.04 francs in 1863, to 1.51 francs in 1868, and to 2.10 francs in 1875.

The following table shows the different departments of France, with the total expenditure for primary education for every inhabitant in 1875:

Departments.	Francs.	Departments.	Francs.
Hautes-Alpes.....	4.08	Eure.....	2.17
Lozère.....	3.66	Charente.....	2.14
Basses-Alpes.....	3.31	Manche.....	2.09
Bas-Rhin.....	3.06	Gard.....	2.07
Haut-Rhin (Belfort).....		Cher.....	2.06
Jura.....	2.94	Haute-Garonne.....	2.00
Haute-Saône.....	2.93	Hérault.....	2.00
Oise.....	2.90	Rhône.....	2.00
Seine.....	2.83	Ardèche.....	1.97
Yonne.....	2.77	Haute-Savoie.....	1.97
Meuse.....	2.73	Nièvre.....	1.96
Hautes-Pyrénées.....	2.73	Sarthe.....	1.96
Ardennes.....	2.66	Alpes-Maritimes.....	1.94
Corse.....	2.65	Nord.....	1.94
Haute-Marne.....	2.64	Pas-de-Calais.....	1.94
Ariège.....	2.62	Lot-et-Garonne.....	1.93
Isère.....	2.62	Corrèze.....	1.92
Pyrénées Orientales.....	2.61	Gironde.....	1.91
Marne.....	2.59	Lot.....	1.91
Seine-et-Marne.....	2.58	Seine-Inférieure.....	1.91
Doubs.....	2.57	Loir-et-Cher.....	1.90
Drôme.....	2.55	Basses-Pyrénées.....	1.90
Seine-et-Oise.....	2.46	Saône-et-Loire.....	1.89
Côte-d'Or.....	2.45	Creuse.....	1.88
Aube.....	2.43	Indre-et-Loire.....	1.86
Aude.....	2.42	Mayenne.....	1.86
Cantal.....	2.42	Indre.....	1.84
Eure-et-Loir.....	2.42	Allier.....	1.81
Aveyron.....	2.39	Landes.....	1.78
Tarn-et-Garonne.....	2.38	Bouches-du-Rhône.....	1.70
Gers.....	2.34	Maine-et-Loire.....	1.67
Savoie.....	2.34	Vaucluse.....	1.66
Somme.....	2.33	Var.....	1.65
Aisne.....	2.31	Haute-Vienne.....	1.63
Calvados.....	2.31	Vendée.....	1.61
Dordogne.....	2.29	Loire.....	1.55
Ain.....	2.28	Vienne.....	1.45
Loiret.....	2.27	Ille-et-Vilaine.....	1.41
Meurthe-et-Moselle.....	2.24	Puy-de-Dôme.....	1.37
Orne.....	2.23	Côtes-du-Nord.....	1.30
Deux-Sèvres.....	2.22	Loire-Inférieure.....	1.18
Vosges.....	2.22	Haute-Loire.....	1.15
Charente-Inférieure.....	2.20	Finistère.....	1.05
Tarn.....	2.18	Morbihan.....	.86

EDUCATIONAL PROGRESS UNDER THE REPUBLIC.

After the overthrow of the second empire, M. Jules Simon, one of the most distinguished educational writers in France, became minister

Years.	Francs.	Years.	Francs.	Years.	Francs.
<i>V. State grants.</i>		<i>V. State grants.</i>		<i>V. State grants.</i>	
1855.....	3,074,161	1863.....	2,556,299	1871.....	8,620,447
1856.....	3,087,390	1864.....	2,709,664	1872.....	9,049,101
1857.....	3,096,832	1865.....	2,731,630	1873.....	9,685,182
1858.....	2,971,961	1866.....	3,058,433	1874.....	9,724,033
1859.....	2,752,406	1867.....	3,509,111	1875.....	9,706,575
1860.....	2,362,272	1868.....	5,438,251	1876.....	10,505,261
1861.....	2,269,528	1869.....	6,584,576	1877.....	12,150,765
1862.....	2,124,379	1870.....	6,679,470		

The following table shows the total ordinary and extraordinary expenditure of communes, departments, and the state for primary education:

Years.	Francs.	Years.	Francs.	Years.	Francs.
1855.....	29,594,531	1863.....	38,758,335	1871.....	61,991,508
1856.....	30,626,789	1864.....	40,599,088	1872.....	67,761,207
1857.....	32,049,456	1865.....	41,286,393	1873.....	72,846,290
1858.....	32,165,652	1866.....	41,650,392	1874.....	76,125,323
1859.....	33,271,209	1867.....	40,367,514	1875.....	77,687,531
1860.....	34,063,912	1868.....	57,427,083	1876.....	83,329,737
1861.....	35,336,074	1869.....	57,998,048	1877.....	89,659,690
1862.....	36,976,384	1870.....	61,640,894		

The following table shows the total expenses for primary instruction from 1855 to 1877:

Years.	Communal.	Departmental.	State.	Total.
	<i>Francs.</i>	<i>Francs.</i>	<i>Francs.</i>	<i>Francs.</i>
1855.....	19,177,759	5,412,867	5,003,905	29,594,531
1856.....	19,994,518	5,462,674	5,169,598	30,626,789
1857.....	21,273,450	5,506,031	5,269,975	32,049,456
1858.....	21,154,938	5,725,717	5,284,997	32,165,652
1859.....	21,908,834	5,907,064	5,455,311	33,271,209
1860.....	22,813,461	5,826,415	5,424,036	34,063,912
1861.....	24,114,234	5,904,976	5,316,854	35,336,074
1862.....	25,085,473	6,469,743	5,421,168	36,976,384
1863.....	27,026,612	6,261,741	5,469,982	38,758,335
1864.....	28,752,563	6,366,600	5,479,925	40,599,088
1865.....	28,989,192	6,503,034	5,794,167	41,286,393
1866.....	29,151,532	6,625,247	5,873,613	41,650,392
1867.....	27,472,062	6,688,837	6,206,615	40,367,514
1868.....	38,642,194	9,646,020	9,138,869	57,427,083
1869.....	38,036,600	10,143,935	9,817,513	57,998,048
1870.....	41,823,077	9,258,506	10,559,310	61,640,894
1871.....	39,505,043	10,131,545	12,354,921	61,991,508
1872.....	41,591,079	10,822,856	15,347,273	67,761,207
1873.....	44,688,505	12,292,657	15,865,128	72,846,290
1874.....	46,521,070	13,238,353	16,635,900	76,125,323
1875.....	48,237,986	13,097,513	16,352,032	77,687,531
1876.....	50,802,717	14,632,444	17,894,575	83,329,737
1877.....	51,483,575	16,140,355	22,035,760	89,659,690

Expenditure for every pupil and inhabitant.—In 1863 the expenditure for every pupil in the primary school amounted to 9.47 francs; in 1876 it amounted to 17.83 francs. The total expenditure compared with the total population shows that the expenditure for every inhabitant of France amounted to 82 centimes in 1855, to 1.04 francs in 1863, to 1.51 francs in 1868, and to 2.10 francs in 1875.

The following table shows the different departments of France, with the total expenditure for primary education for every inhabitant in 1875:

Departments.	Francs.	Departments.	Francs.
Hautes-Alpes.....	4.08	Enre.....	2.17
Lozère.....	3.66	Charente.....	2.14
Basses-Alpes.....	3.31	Manche.....	2.09
Bas-Rhin.....	3.06	Gard.....	2.07
Haut-Rhin (Belfort).....		Cher.....	2.06
Jura.....	2.94	Haute-Garonne.....	2.00
Haute-Saône.....	2.93	Hérault.....	2.00
Oise.....	2.90	Rhône.....	2.00
Seine.....	2.83	Ardèche.....	1.97
Yonne.....	2.77	Haute-Savoie.....	1.97
Meuse.....	2.73	Nièvre.....	1.96
Hautes-Pyrénées.....	2.73	Sarthe.....	1.96
Ardennes.....	2.66	Alpes-Maritimes.....	1.94
Corse.....	2.65	Nord.....	1.94
Haute-Marne.....	2.64	Pas-de-Calais.....	1.94
Ariège.....	2.62	Lot-et-Garonne.....	1.93
Isère.....	2.62	Corrèze.....	1.92
Pyrénées Orientales.....	2.61	Gironde.....	1.91
Marne.....	2.59	Lot.....	1.91
Seine-et-Marne.....	2.58	Seine-Inférieure.....	1.91
Doubs.....	2.57	Loir-et-Cher.....	1.90
Drôme.....	2.55	Basses-Pyrénées.....	1.90
Seine-et-Oise.....	2.46	Saône-et-Loire.....	1.89
Côte-d'Or.....	2.45	Creuse.....	1.88
Aube.....	2.43	Indre-et-Loire.....	1.86
Aude.....	2.42	Mayenne.....	1.86
Cantal.....	2.42	Indre.....	1.84
Eure-et-Loir.....	2.42	Allier.....	1.81
Aveyron.....	2.39	Landes.....	1.78
Tarn-et-Garonne.....	2.38	Bouches-du-Rhône.....	1.70
Gers.....	2.34	Maine-et-Loire.....	1.67
Savoie.....	2.34	Vaucluse.....	1.66
Somme.....	2.33	Var.....	1.65
Aisne.....	2.31	Haute-Vienne.....	1.63
Calvados.....	2.31	Vendée.....	1.61
Dordogne.....	2.29	Loire.....	1.55
Ain.....	2.28	Vienne.....	1.45
Loiret.....	2.27	Ille-et-Vilaine.....	1.41
Meurthe-et-Moselle.....	2.24	Puy-de-Dôme.....	1.37
Orne.....	2.23	Côtes-du-Nord.....	1.30
Deux-Sèvres.....	2.22	Loire-Inférieure.....	1.18
Vosges.....	2.22	Haute-Loire.....	1.15
Charente-Inférieure.....	2.20	Finistère.....	1.05
Tarn.....	2.18	Morbihan.....	.86

EDUCATIONAL PROGRESS UNDER THE REPUBLIC.

After the overthrow of the second empire, M. Jules Simon, one of the most distinguished educational writers in France, became minister

of public instruction. The chief aim of the new minister was to make primary education as general as possible and to raise the French schools of all grades to a level with the best in any country of the world. On the 11th of October, 1870, he decreed the foundation of an elementary normal school for both sexes. In his circular he says:

If you ask why we establish this school now, at a time when everybody is anxiously watching the fearful conflict raging in the very heart of our country, at a time when all other duties seem to be absorbed in the one of national defence, we answer that this question of reform in the field of education was matured long ago; that we have studied it for many years; that not a day is to be lost. * * * The unexampled misfortunes which have befallen the country during the last two weeks of the empire should teach us the lesson, never to be forgotten, that the only power which makes a nation invincible is intellectual and moral power. This we must restore before we can hope for any victory on the battle field.

In 1871 M. Jules Simon prepared a bill and submitted it to the Chambers. Although it did not become a law, in consequence of opposition from the conservative parties, it has served as a basis for later educational laws and decrees. The following are the most important articles of M. Jules Simon's bill:

1. Every child between 6 and 13 must receive a minimum of education, either in the public or private schools, embracing the obligatory branches of instruction, to be certified to by the ministry of public instruction, through its subordinates in the departments, at the end of the period of schooling.

2. A school committee, consisting of delegates from the canton, the mayor, the clergyman, and three heads of families appointed by the municipal council, is to note the attendance at school.

3. The government inspector in each district has a seat and vote in this committee.

4. If a child misses school three times during a month, without excuse, the father or guardian is summoned before the school committee and is warned. If the case recurs his name is placarded at the mayor's office and his family is deprived of all aid from the public fund. If this does not induce him to send his child to school, a fine not exceeding 100 francs is imposed, and, finally, he can be deprived of his rights as a citizen for a period of three years.

5. The school committee issues certificates to children 13 years of age who have passed a public examination, to which all must submit, whether educated in public or private schools. If, at this examination, it becomes evident that a child, who was supposed to receive private instruction, has in reality not received instruction in the obligatory branches, legal proceedings are instituted against the father or guardian.

6. From January 1, 1880, no citizen 21 years old will be registered as an elector who does not possess the above mentioned certificate from his local school committee or give sufficient proof of being able to read and write.

Later, in 1877, M. Bardoux, then minister of public instruction, prepared another primary education bill, which also failed to become a law. The principal features of this bill are:

1. Every commune has a right to make its public schools perfectly free.

2. Communes which do not wish the assistance of the state for the establishment of free schools have to defray expenses for this purpose from their own resources.

3. State subsidies are granted to communes in case the school tax does not suffice to cover the expenses for public instruction. The minimum of taxation shall be 4 centimes on the franc (of the taxes raised); the maximum, 10 centimes.

4. As soon as free schools are established in a commune all public schools without distinction must be free. Under extraordinary circumstances the local authorities may, with the permission of the minister of public instruction, make a temporary exception to this rule.

5. The mode of taxation for school purposes in communes which desire state subsidies under the present law shall be regulated by a special decree of the ministers in council.

The present minister of public instruction, M. Jules Ferry, has warmly advocated the passage of a law tending to make primary education gratuitous, obligatory, and of lay character. This bill has passed the Chamber and is now before the Senate. The following are the principal features of the bill to establish gratuitous, obligatory, and lay instruction in all primary and advanced primary schools, submitted by M. Barodet and a large number of his colleagues, and favorably reported to the Chamber of Deputies, December 6, 1879:¹

SECTION I.

Chapter I.—Primary schools.

ARTICLE 1. Primary instruction is given (1) in infant schools; (2) in primary schools proper; (3) in advanced primary schools.

These schools may be public (communal, departmental, or state schools) or private (belonging to individuals or associations).

The present *salles d'asile* take the name of *écoles enfantines* (infant schools).

ART. 2. Instruction in infant schools comprises instruction in morals; reading and writing of words and numbers; object lessons; elements of singing; and gymnastics.

ART. 3. Instruction in primary schools proper comprises instruction in morals and civil duties; reading and writing; elements of the French language and literature; geography, especially of France; history, especially modern history of France; elements of law and political economy; elements of natural, physical, and mathematical sciences; their applications to agriculture, hygiene, industrial arts, manual work, and the use of the tools of principal trades; elements of drawing, modelling, and music; gymnastics. For boys, military exercises; for girls, needle-work.

ART. 4. In the advanced primary school the branches of instruction of the primary school proper are more fully developed.

ART. 5. Instruction in at least one foreign language, obligatory in the advanced primary schools, may be given in the primary schools proper and in the infant schools.

Chapter II.—Teachers' diplomas.

ART. 6. There are three kinds of diplomas conferred after public examination: (1) The diploma for infant school teachers; (2) the diploma for primary school teachers; (3) the diploma for advanced primary school teachers.

SECTION II.—OBLIGATORY PRIMARY INSTRUCTION.

Chapter I.—Conditions of obligatory attendance.

ART. 8. Primary instruction is obligatory for all children of both sexes between 6 and 13. This instruction may be given in public or private schools or at home.

ART. 10. The parents or guardians have to inform the mayor of the commune at

¹ The committee for the examination of this bill consisted of M. Paul Bert, president, and 21 other members of the Chamber of Deputies.

least 15 days before the opening of the schools whether they intend to send their children to public or private schools.

ART. 11. The mayor of the commune prepares every year a list of the children of school age and sends copies of the same to the directors of public and private schools and to the school inspector.

ART. 12. Whenever a child leaves a school the parents or guardians must inform the mayor at once.

ART. 13. The directors of public and private schools have to submit every month to the mayor and the inspector of schools a list of absentees and the causes of absence from school.

Chapter II contains various disciplinary measures.

SECTION III.—PUBLIC SCHOOLS.

Chapter I.—The establishment and management of public schools.

ART. 20. The programmes and regulations of public schools are prepared by the minister of public instruction.

ART. 21. Industrial training appropriate to local wants and resources shall be given in the advanced primary schools.

ART. 22. Religious instruction shall be given, with the consent of the parents, by the ministers of the different denominations outside of the school buildings and at an hour fixed by the departmental director.

ART. 23. Each commune must have at least one primary school. Communes of 500 inhabitants and more must have at least one primary school for boys and one for girls.

ART. 24. An advanced primary school must exist in every canton. An infant school must exist in every commune of 2,500 inhabitants.

ART. 25. In Algeria the establishment of advanced primary schools and infant schools is obligatory for all communes having a European population of 1,500.

ART. 26. The primary school admits children at their fifth year in communes without infant schools and at their sixth year in communes with infant schools.

The infant school admits children of both sexes until they are 6 years of age.

The advanced primary school admits pupils from their twelfth year, if they possess the required preparatory training.

ART. 27. Infant schools and all grades of primary schools for girls are taught by female teachers. Boys' schools are in charge of male teachers only.

Female teachers may act as assistants in boys' primary schools in case they are the wives, sisters, or near relatives of the directors of the respective schools.

ART. 28. Courses for adults shall be established in connection with all primary schools. These courses shall be conducted by the male and female teachers of primary schools.

Chapter II.—Teachers.

ART. 29. Teachers must be (1) French citizens; (2) must be provided with certificate of capacity; and (3) must not belong to any religious order, institute, community, or congregation, and not be a minister of a religious denomination.

ART. 30. All administrative functions and all commercial and industrial pursuits are forbidden to public school teachers.

ART. 31. Primary school teachers are appointed by the departmental director.

Chapter III.—Primary normal schools.

ART. 39. Each department is obliged to maintain two primary normal schools, one for males and one for females. A practice school must be connected with each normal school.

Chapter IV.—Gratuity of education.

ART. 46. Instruction is gratuitous in the three kinds of primary schools: Infant schools, primary schools proper, and advanced primary schools. Instruction is also gratuitous in the primary normal schools.

ART. 47. The salaries of primary teachers are as follows: First class teachers, 1,900 to 2,200 francs; second class teachers, 1,600 to 1,800 francs; third class teachers, 1,300 to 1,500 francs; fourth class teachers 1,000 to 1,200 francs.

Directors and directresses receive 300 francs in addition to the above amounts.

ART. 51. The expenses for buildings (school-houses and teachers' dwellings), school furniture, heating, and cleaning are at the charge of the communes.

The expenses for building and maintenance of normal schools are at the charge of the departments.

ART. 52. The salaries of teachers and all other functionaries of primary schools are at the charge of the state.

SECTION IV.—PRIVATE SCHOOLS.

ART. 55. The directors of private schools prepare their own programmes.

ART. 56. Any French citizen 21 years of age may open a private primary school, provided he does not belong to any religious order, institute, congregation, or community. He must, moreover, be in possession of a teacher's diploma.

ART. 59. A teacher who desires to open a private school must previously give notice to the mayor of the commune and the departmental director.

ART. 60. The departmental director may oppose the establishment of a private school for moral or sanitary reasons. In case of an opposition on the part of the departmental director the matter must be laid before the departmental educational council. From the decision of this council an appeal may be taken to the superior council of public instruction. Section V contains the regulations concerning the creation of a new office, that of departmental director, who is to take the place of the prefect as far as educational affairs are concerned.

ENCOURAGEMENT OF TEACHERS UNDER THE REPUBLIC.

In order to enable primary school teachers to visit Paris during the Universal Exposition of 1878, the French Chambers appropriated 100,000 francs, and placed this amount at the disposal of the minister of public instruction. A committee was appointed to make the necessary arrangements. They decided to invite 1,000 teachers, 90 school inspectors, 80 directors of normal schools, and 80 normal school teachers. These 1,250 delegates were invited to attend the educational conferences arranged for them at the Sorbonne. The opening speech was made, August 16, 1878, by M. Casimir Perier, under secretary in the ministry of public instruction, worship, and fine arts. The first conference was held on the same day by M. E. Levasseur, of the Institute of France. He spoke of the teaching of geography, which is one of M. Levasseur's favorite subjects. The second conference was held by M. B. Berger, inspector of primary schools and late delegate of the French government to the Philadelphia Exhibition. His subject was the teaching of the mother tongue. The third conference was held by M. Brouard, who explained the method of teaching history in primary schools. He was followed by M. G. Jost, whose subject was teachers' conferences and educational libraries; M. Maurice Girard, who spoke on the teaching of physical and natural sciences in primary schools; M. Michel Bréal, whose subject was the teaching of the French language in primary schools; Dr. Riant, who treated school hygiene; M. A. Dupaigne, on singing in schools; M. Liès-Bodard, on elementary chemistry, and M. F. Buisson, late president of

the French delegation to the Philadelphia Exhibition, who had chosen for his subject the intuitive method. M. Bardoux addressed the conference twice. Translations of his excellent addresses are given in the Report of the Commissioner of Education for 1878, pages clvi and clvii.

Educational conferences are very much encouraged by the present minister of public instruction, M. Jules Ferry. On the occasion of the annual assembly of the learned societies, he invited the directors and directresses of normal schools and a section of primary inspectors to meet together at Paris during Easter week in 1880, in order to take part in the educational conferences. The two following questions had been submitted for their examination:

(1) The organization of primary schools with a single teacher.

(2) The means of securing the best supply of students for normal schools, conditions of preparation, and admission.

Elaborated at first in each of the sections, these questions were then discussed in two general meetings, and were embodied in a number of resolutions which were adopted by the full assembly.

The closing meeting took place on Friday, April 2, at the Salle Gerson, and was presided over by the minister of public instruction, who was supported by M. Gréard, vice rector of the Academy of Paris, M. Buisson, inspector general and director of primary instruction, and M. Boutan, inspector general and honorary director of primary instruction. M. Gréard rendered an account of the work of the various sections. He called attention to the excellent results produced by this first pedagogic congress. The two secretaries (rapporteurs) MM. Clerc, primary inspector at Paris, and Mariotti, director of the normal school of Versailles, read the resolutions adopted on each of the two questions.

The following is the text of the resolutions as to the first question on organization of schools with one teacher:

(1) Whereas it is important to economize the teaching power of the master, putting him as much as possible in direct communication with his pupils, and thus facilitating simultaneous instruction; and whereas account must also be taken of the difficulty of meeting with suitable assistance: the congress fixes a maximum of 50 pupils to one teacher. Every school which exceeds this number must be provided with an assistant. This number comprises all the pupils in the school, from five years old and upwards, and will be determined by taking as a basis the six months during which the school has been best attended.

(2) Whereas the diversity of ages and mental aptitude necessitates the creation of several divisions; whereas, on the other hand, it is important not to multiply the divisions, so as not to disperse the teaching power of the master and lose the fruits of emulation; and whereas it is important that the course of instruction from year to year should differ only by degrees: the conference is of opinion that three courses should be constituted: an elementary course, a middle course, and a higher course.

(3) Whereas it is necessary to set forth in detail the subjects of instruction in each course, so as to determine exactly the work of the master; and whereas the duration of the school period is often reduced for country children, who ought, nevertheless, to receive as thorough a schooling as possible: the congress is of opinion that each course should have its particular programme, and that this programme should be for one year,

with temporary power to go through it in less time, provided that it be no less than six months.

(4) Whereas the object to be obtained is the same in all schools, and should be secured by the most efficacious means; and whereas the schools in the department of the Seine have excellent programmes and have produced most satisfactory results thereby: the congress is of opinion that the programmes of primary instruction should be obligatory in all rural schools, and that these programmes should be modelled on those of the department of the Seine.

(5) Since there is room for raising the standard of the subjects of study and for putting it more in harmony with the needs of the times, the congress thinks that the programme of obligatory subjects should be augmented, and recommends the following additions: (a) drawing; (b) singing; (c) principles of civic education; (d) elements of hygiene and of physical and natural sciences applicable to the usages of life; (e) the elements of political and domestic economy. The subjects comprised under the last two heads are to be taught in the form of object lessons.

(6) Whereas each subject should be assigned a place proportioned to its importance: the congress is of opinion that there should be uniformity for all the schools in the distribution of the time given to the various studies.

(7) Since the only really profitable instruction is that given by the master and since it is important to multiply the means of putting the teacher in direct communication with his pupils: the congress is of opinion that the lessons should be given in the collective form for all the pupils of the school to a very large extent.

(8) Whereas the great inequality in the attainments of children compels the subdivision of the elementary course, at least for some subjects (while on the other hand care should be taken to reduce to a minimum the number of the divisions, in order that the pupils may receive most frequently their instruction direct from the master): the congress, while reasserting its opinion that no course should be divided, thinks that a subdivision may be tolerated provisionally, and for certain subjects only, in the elementary school.

(9) Whereas woman is particularly fitted for the training of young children, and additional assistance will be necessitated by the subdivision spoken of in the last resolution; and whereas in the special case of mixed schools the presence of women is desirable: the conference is of opinion that the master should be empowered to employ a helper, who should be, if possible, the wife, sister, daughter, or mother of the teacher, and that the pupils should be utilized as helpers only in exceptional cases.

Following is the text of the resolutions as to the second question, the means of securing the best supply of students for normal schools:

(1) Since primary normal schools are usually recruited from families of moderate means, and as for these families attendance at school at an age when children might contribute by their labor to the common well being is equivalent to a loss of income, the congress thinks that subsidies or scholarships should be granted to aspiring male and female students during the time of their preparation.

(2) Since the creation of preparatory schools annexed to normal schools presents grave difficulties, the congress is of opinion (1) that this preparation should be confided to public school teachers, and (2) that due encouragement should be given by means of rewards for the prosecution of this work.

(3) Since preparation in normal schools requires some amount of ripe judgment, the congress unanimously asks that no one be admitted into these schools before the age of sixteen in the case of males and fifteen in the case of females, and that for both the age of eighteen should be the maximum limit for admission.

(4) Since the primary inspectors cannot satisfactorily furnish sufficient data to the higher authority as to the intellectual worth and moral aptitude of candidates, the congress thinks that the examinations for admission to the normal school, after due inquiry and medical examination, should take place at the normal school, and that

the candidates should be boarded and lodged at the expense of the department during the time necessary — eight or ten days at least — for the examiners to class them in order of merit.

(5) Considering the importance of raising the standard of studies in the normal schools, the congress expresses the wish (1) that the certificate of primary studies, obtained in conformity with a well considered official programme, should be henceforth exacted from candidates for the bursaries of the normal school; (2) that the scale of mistakes allowable in the test for spelling should be revised, and that this test should cease to exclude; (3) that the subject of style should not be exclusively borrowed from history; (4) that the elements of practical geometry should be added to the test of arithmetic; (5) that drawing and writing should be subjected to additional tests.

(6) Since the teaching staff of the normal schools is particularly interested in the due supply of students, the congress is of opinion that this staff should form part of the commission of examination for admission with the primary inspectors, and that the number of scholarships held in each normal school should be equal to the number of pupils necessary for the annual supply of teachers.

(7) Favors the furnishing of books, &c., to normal pupils free of charge.

(8) Relates to the duty of graduates to serve in school after they have received a training in the normal school.

(9) In order to give an impetus to study, the congress recommends the publication of the programmes of instruction since 1866.

(10) No student should be allowed to graduate before he has completed a course of three years.

The eleventh, twelfth, and thirteenth resolutions are of purely local interest.

(14) Without specifying the motives leading to its conclusion, the congress desires the radical suppression of all equivalents for the certificate of competency.

(15) Students should endeavor to obtain the higher or complete certificate of competency.

The sixteenth resolution is of local interest.

(17) Without deeming it necessary to assign its motives, the congress considers it the duty of all those who hold office, in all grades of primary instruction, to support to the best of their ability the authority of the University of France.

(18) Considering that no citizen ought to avoid serving his country in arms when circumstances demand it and that it is important to establish equality between all citizens on this particular point, the congress is of opinion that the schoolmaster should be liable to military service.

M. Chopinet, director of the normal school of Clermont, then read, amid the cheers of the assembly, an address to the minister of public instruction, in which he expressed the great regard in which the minister was held by all those who were engaged in primary instruction. The minister then pronounced the following discourse:

GENTLEMEN: I am profoundly touched by the sentiments which have just been expressed, the warmth of which probably surpasses the amount of reward which you intended to offer me to-day. I am also very much touched to see such an assembly before me. This meeting has been called on the proposition of my colaborers, of those who have already worked before me at the development of popular instruction. You see one of them on my right. It may be said of Monsieur le Recteur, without wounding the feelings of others, that he is one of the "maitres du bien" of our country, and that for many years the several ministers of public instruction have learned something from him, and that several have benefited much from his large experience, his rare tact, and his judicious foresight.

What does a minister of public instruction amount to? Just what his colaborers

are worth. And knowing that you have worked much during this first congress and that you have used the time well which was given you for study and recreation, I have come here to tell you that we in the ministry work too, and that we work much. You know this; you read the *Journal Général*. But it will doubtless be agreeable to you and useful for everybody to know what has been done in the ministry during the last year, both from a legislative and an administrative standpoint.

Nobody should believe and I should not want to have it said that the ministry of public instruction has occupied itself during the last year with nothing else but politics and article 7. The ministry has worked at the preparation of a number of laws, some of which have been promulgated and some of which are still to be acted on. The law concerning the establishment of normal schools for girls has passed both Chambers. We have also got through the Chambers the two laws tending to make the teaching of agriculture and gymnastics obligatory in primary schools. We have also defended before the Chambers and promulgated the law which reorganizes the superior council of education. This law allows you, as you know, for the first time to exercise the right of citizenship in the great University of France, to which you belong on account of your origin, your education, and your broad and liberal principles.

We have submitted another bill which gives satisfaction to the wishes expressed in your address because it tends to amend the laws relative to certificates of capacity and suppresses the letters of obedience. We have also submitted a project of law making education gratuitous and obligatory. [Here the minister refers to the attempts made by MM. Jules Simon and Waddington.]

As regards primary inspectors, we have increased their travelling fees, so that they may visit the schools more frequently.

You know what we have done for the normal schools. I consider it an honor to myself to have increased the salaries of lady principals. Ladies, this duty had been neglected too long. I also wish to increase the salaries of the male principals, and I have inserted a sum for this purpose in the budget.

Now, as regards the administrative work of the ministry, do you know what has been accomplished under the able and energetic direction of the collaborer on my left [M. Buisson]? From February 1, 1879, to April 1, 1880, we have established 700 schools and created 800 new places for assistant teachers.

After speaking of the new council of education and the work to be laid before it, and making a few remarks to the school inspectors, the minister withdrew and the congress adjourned.

EDUCATIONAL TOURS.

The following letter of the French minister of public instruction explains an interesting method by which it is sought to improve the qualifications of teachers in the French Republic:

PARIS, *May 7, 1880.*

MONSIEUR LE RECTEUR: I hasten to bring to your knowledge two measures which I have thought necessary to encourage our young teachers in thorough and earnest study. At my suggestion the President of the Republic has been pleased to sign a decree modifying article 5 of the decree of April 19, 1862. Henceforth the student who has obtained a full certificate of capacity on leaving the normal school will receive not the former indemnity of 100 francs, but 200 francs.

Besides this favor, the object of which is to aid the better class of our normal graduates at the start of their career, I have sought for some other reward which might at the same time further their intellectual development. I think I have found it in an institution that is already old and has even been discarded in this country, but which has been successfully revived during the last few years, especially in the higher normal schools of Paris. I allude to educational tours during the holidays.

The holiday excursions I desire to organize in the interest of our best normal students should be essentially educational tours; scientific expeditions I will not call them, but expeditions carefully arranged, well directed, and animated by the spirit of methodic observation. They should be under the guidance of a learned and experienced teacher, whom I shall select among the *maitres-adjoints* (assistant teachers) who have had charge during the year of the heavy task of supervision. The young students will get accustomed to see for themselves, to see much, and, above all, to see well, historical monuments, relics of archaeology, picturesque views, topographical peculiarities, natural phenomena, the products of industry and agriculture, local traditions, customs, and languages, all of which should be to them material for study and reflection. Under these conditions the tour would bear all its fruits, without being necessarily very extensive or very long. According to the number of normal students who desire to take part, several educational caravans may be organized to send the students of northern departments to the south of the country and those of the interior departments to the seashore; in thus presenting the country to them from new points of view, they will get a better knowledge of it and love it more.

Later, when these vacation tours have been successfully organized and conducted, their range may be extended; they may for example pass into adjoining foreign countries where primary education and the study of educational science are in high esteem. This would be a new source of fruitful observations and beneficial comparisons.

I look for the best results from this daily intercourse of the most distinguished of our normal pupils during their holiday tour, and hope that it may dissipate many provincial prejudices.

The young tourists will be expected to write an account of what has particularly interested them; the best passages of these memoirs may be reproduced in the departmental educational bulletins.

You are requested, *Monsieur le Recteur*, to forward me a list of the normal pupils who have obtained the complete certificate in 1879 and 1880 and whom you recommend for the first expedition, to be organized during the coming holidays. Immediately after the close of the session of July, you will add the names of the new students who have received the complete certificates. I shall inform you at what date, to what parts of the country, and under what conditions the first tour of the normal pupils will take place.

Respectfully, &c.,

JULES FERRY,

Minister of Public Instruction and Fine Arts.

MINISTERIAL DECREE RELATING TO PRIMARY EDUCATION.

Following are the regulations governing the admission of children to public primary schools in France (ministerial decree of June 7, 1880):

ARTICLE 1. To be admitted to a public primary school in France, children must be over 6 and under 14 years of age. Outside of these limits they cannot be admitted without a special permit of the academic inspector.

ART. 2. Each child must furnish a certificate of birth. The teacher shall be assured that the child has been vaccinated and that it is free from contagious diseases.

ART. 3. As regards religious instruction, the wishes of the parents shall always be complied with.

ART. 4. The teacher has charge of the class-room; he shall not allow the same to be used for any purpose foreign to the school without the authorization of the prefect of the department.

ART. 5. During school hours the teacher is not allowed to take up anything not belonging to his professional duties.

ART. 6. Pupils may not be taken from their studies during school hours.

ART. 7. No person is allowed to enter the school except the legal inspectors and supervisors.

ART. 8. The teachers shall make no distinction between paying and non-paying pupils. They must all, without distinction, receive the same lessons in the same class rooms.

ART. 9. The schools shall be in session three hours in the morning and three hours in the afternoon. The morning session begins at 8 o'clock and the afternoon session at 1 o'clock. Each session shall be divided by a recess of a quarter of an hour. At the request of local authorities, the academic inspector, the hours for beginning and closing the sessions may be modified according to circumstances.

ART. 10. The children must come to school in clean clothes. The teacher shall examine the pupils in this respect at the beginning of the school.

ART. 11. When a teacher is put in charge of a school, he shall make an inventory of the furniture, apparatus, books, and of his personal property and that of his assistants.

ART. 12. A price list of books, &c., approved by the school inspector, shall be placed in every school. This list contains the books, &c., which the teacher is authorized to sell to his pupils.

ART. 13. The school rooms must be whitewashed or cleaned every year and must always be kept clean and in a healthy condition. They must be swept once a day; they must frequently be ventilated. During recess the windows must be open.

ART. 14. French shall be the only language used in the schools.

ART. 15. All theatrical performances are forbidden in the public schools.

ART. 16. No books, pamphlets, or manuscripts, except those authorized by the academic inspector, shall be used in school.

ART. 17. Petitions, collections, subscriptions, or lotteries are also forbidden.

ART. 18. The teacher is not allowed to inflict any punishment, with the exception of bad marks, reprimands, a partial privation of recreation, keeping after school under the control of the teacher, and temporary exclusion from the school. The last penalty may not exceed two days. The teacher must notify the parents at once; also, the local authorities and the primary inspector.

ART. 19. It is strictly forbidden to inflict corporal punishment.

ART. 20. The school shall be closed on Thursday and Sunday of each week and on special holidays.

ART. 21. Extra holidays are: One week at Easter; New Year's day, or the following day if new year falls on a Sunday or a Thursday; the day after Whitsunday; the day after All Saints' day; the patron days; the national holidays.

ART. 22. The time and duration of the long vacations shall be fixed every year by the prefect and the departmental council.

ART. 23. The teacher may not change the school days or absent himself without the authorization of the primary inspector and without giving notice to the local authorities. In case the teacher wants to absent himself more than three days, he has to have the permission of the academic inspector. Leave of absence for more than one week can only be given by the prefect.

ART. 24. The organization of the school, the preparation of programmes and time tables, &c., shall be the duty of the departmental council. Their decisions shall be submitted for approval to the academic inspector and rector.

ART. 25. These regulations shall also be applied to schools for girls.

ART. 26. The regulations of August 17, 1851, are abrogated.

PARIS, June 7, 1880.

JULES FERRY.

Minister of Public Instruction and Fine Arts.

III.

Following is an abstract of the report on primary education in Paris and in the department of the Seine from 1867 to 1877,¹ by M. Gréard, member of the Institute, inspector general of public instruction and director of primary instruction in the prefecture of the Seine:

INTRODUCTION.

In the introduction of this report, which was prepared for the Paris Universal Exposition, M. Gréard, says: "Universal exhibitions are for every nation an opportunity to examine by review what progress it has made and what still remains to be done. In the present report, we intend to show what has been accomplished in Paris and the department of the Seine for the development of primary education. The events of 1870 arrested but did not entirely stop the work of improvement. It has been resumed with fresh vigor since 1871, thanks to the resources placed at the disposal of the educational authorities by the municipal council of Paris and the council general of the department of the Seine. This résumé of the reforms realized from 1867 to 1877 will perhaps be the more interesting as these ten years form the first period of the application of the present pedagogic organization of our schools, the principles of which have served as a basis for all the improvements which have been made."

PRIMARY EDUCATION AT PARIS.

Condition in 1867.—In 1866 the population of Paris was 1,825,274, viz, 929,958 males and 895,316 females.

The number of children between the ages of 2 and 6 and 6 and 14 in 1866 may be estimated at 296,397. Of these 296,397 children, 155,700 were on the rolls of public and private primary schools in 1867; viz, 73,988 in public schools, 81,712 in private schools, 16,085 in the *salles d'asile*. The total number of pupils in attendance was 139,615, viz, 60,390 in public and 79,225 in private schools.

The number of establishments was 1,491, viz, 303 public and 1,188 private schools. Among the 303 public schools there were 83 *salles d'asile*, and among the 1,188 private schools 37. There were thus 1,371 primary schools, viz, 414 for boys and 957 for girls. Paris had, therefore, in 1866-'67, 1 public *salle d'asile* to every 21,991 inhabitants and 1 private *salle d'asile* to every 49,331 inhabitants, or 1 public or private *salle d'asile* to every 15,210 inhabitants; 1 public primary school to every 8,296 inhabitants and 1 private primary school to every 1,585 inhabitants, or 1 public or private school to every 1,331 inhabitants.

¹ L'enseignement primaire à Paris et dans le département de la Seine de 1867 à 1877. Paris, 1878.

Condition in 1877.—In 1876 the population of Paris was 1,988,806. The number of children between the ages of 2 and 6 years was 113,190, and between the ages of 6 and 14, 209,764. In 1877 there were present in the salles d'asile 26,718 children, viz, 22,837 in public and 3,881 in private salles; the number present in the schools was 168,729, viz, 93,157 in public and 75,572 in private schools. There were thus 195,447 children present in salles d'asile and primary schools in 1877. The number of establishments was in the same year 1,404, viz, 146 salles d'asile (110 public and 36 private) and 1,258 schools (285 public and 973 private). Of these 1,404 schools 391 were for boys (141 public and 250 private) and 867 for girls (144 public and 723 private). Paris had thus in 1877 1 public salle d'asile to every 18,080 inhabitants and 1 private salle d'asile to every 55,244 inhabitants, or 1 public or private salle d'asile to every 13,621 inhabitants; 1 public primary school to every 6,978 inhabitants and 1 private primary school to every 2,043 inhabitants, or 1 public or private primary school to every 1,580 inhabitants. There were on the rolls 1.14 per cent. of the population in public salles d'asile and 0.19 per cent. of the population in private salles d'asile, or 1.34 per cent. in public or private salles d'asile; 4.63 per cent. in public schools and 3.80 per cent. in private schools, or 8.43 per cent. in public or private schools. There was in the same year 1 public school for boys to every 14,105 inhabitants and 1 private school for boys to every 7,955 inhabitants, or 1 public or private school for boys to every 5,086 inhabitants; 1 public school for girls to every 13,811 inhabitants and 1 private school for girls to every 2,750 inhabitants, or 1 public or private school for girls to every 2,293 inhabitants; 2.47 per cent. of the population were in public schools for boys and 1.36 per cent. in private schools for boys, or 3.84 per cent. in public or private schools for boys; 2.21 per cent. in public schools for girls and 2.43 per cent. in private schools for girls, or 4.64 per cent. in public or private schools for girls.

From the foregoing data it results that the number of public and private primary schools and salles d'asile in Paris has decreased since 1866-'67 from 1,491 to 1,404. The number of pupils on the rolls has, on the contrary, increased from 155,700 to 195,447, an increase of 39,747, or more than one-fourth.

The total number of new schools erected in Paris since 1867 is 105, viz: 15 in 1867, 6 in 1868, 7 in 1869, 7 in 1870, 6 in 1871, 19 in 1872, 3 in 1873, 20 in 1874, 1 in 1875, 17 in 1876, 4 in 1877. The number of school buildings vacated during the same period is 13, the number of schools transferred to more suitable buildings 44, and the number of buildings enlarged 153. The number of new seats provided since 1867 is 44,814, viz: 40,112 in schools for boys and in schools for girls, and 4,702 in salles d'asile.

The number of children between the ages of 6 and 14 who do not appear to be on the rolls of public or private primary or secondary schools is 41,820. Of these about 3,000 receive an education at home and about

30,000 attend the public or private schools during part of the year. There remain thus 9,000 children for whom school accommodation must be provided; but if the number of children is added who have at present insufficient accommodation, the number of seats to be provided is 26,218. As 10,664 new seats were to be placed at the disposal of the school authorities in 1877, there remained 16,000 seats to be provided.

The organization of the classes.—In 1867 the method of mutual instruction had not yet completely ceased to be in use in the schools of Paris. It had rendered services which it would be unjust to ignore, but which ought not to be exaggerated.

The principle of this method is well known. Bell defined it, with a naïve precision, “the method by means of which an entire school may teach itself under the superintendence of a single teacher.”

The process upon which this method is based has been known in France since the seventeenth century. Madame de Maintenon introduced it at Saint-Cyr. Rollin mentions it as a useful expedient. Fifty years before Bell brought it from India, Herbault applied it to the children of the Hospice de la Pitié (1747). Later it was tried successfully in a school at Vincennes by the Chevalier Paulet (1774), and Abbé Gaultier transported it to London during the Revolution (1792). But Lancaster was the first to arrange it systematically in 1801, and it is under the name of the Lancasterian system that the mutual method was adopted in our schools in 1815.

Adopted by the liberal party, this system was immediately assailed by the opposition. It was said that the Lancasterian system disturbed the basis of social order, by intrusting to children what properly belonged to men. Mutual instruction became a party question. It caused violent political discussions in the press and in the chambers. But this struggle gave the new system a vigorous impetus.

The Lancasterian system offered both pedagogical and financial advantages. The former consisted in the rapid spread of primary education, and the latter in the saving of a large amount of money. The new system cost the city of Paris 2,729,000 francs less for every 50,000 pupils than the old.

The mutual system, which was used a long time, did not give satisfactory results. The children were taught in large halls where the introduction of a graded system was impossible, and although a change was deemed indispensable it took a long time to accomplish it.

The following table shows the number of graded and ungraded schools with but one teacher on October 1, 1867, and October 1, 1877:

	1867.			1877.		
	Lay schools.	Schools of religious orders.	Total.	Lay schools.	Schools of religious orders.	Total.
<i>Schools for boys.</i>						
Number of schools	60	51	111			
Number of classes	146	204	350	473	319	792
Schools containing—						
Thirteen classes				1		1
Twelve classes						
Eleven classes				1		1
Ten classes					1	1
Nine classes				2	2	4
Eight classes				3	5	8
Seven classes	1	3	4	13	8	21
Six classes		2	2	18	16	34
Five classes	1	9	10	24	11	35
Four classes	5	15	20	16	11	27
Three classes	16	22	38	7		7
Two classes	29		29	1		1
One class	8		8	1		1
<i>Schools for girls.</i>						
Number of schools	54	55	109			
Number of classes	110	229	339	427	343	770
Schools containing—						
Ten classes				1		1
Nine classes				1	5	6
Eight classes		1	1	3	6	9
Seven classes		1	1	4	6	10
Six classes		2	2	17	16	33
Five classes		16	16	25	14	39
Four classes	1	19	20	28	9	37
Three classes	10	14	24	4	2	6
Two classes	33	2	35	2		2
One class	10		10	1		1
<i>Recapitulation.</i>						
Total number of schools	114	106	220			
Total number of classes	256	433	689	900	662	1,562
Increase of classes since 1867				644	229	873

The following table shows the attendance at the central drawing schools for girls from 1870 to 1878:

Years.	No. of pupils on the rolls.	Average attendance.
1870	1,298	727
1871	1,427	789
1872	2,058	1,566
1873	2,234	1,768
1874	2,355	1,655
1875	2,296	1,357
1876	2,419	1,486
1877	4,350	3,273
1878	4,330	3,148

School for apprentices.—The instruction of apprentices and adults forms a part of primary education, both on account of the branches taught and the teaching corps.

Two different systems have been tried for this phase of instruction: the school in the workshop and the workshop in the school. The former system is employed in the establishment on the boulevard de la Villette and the latter in the school on the rue Tournefort.

The establishment on the boulevard de la Villette admits pupils who have graduated from the primary school. The course of studies embraces technical and general instruction.

General instruction embraces besides the obligatory primary branches several optional branches, as the elements of physics, mechanics, and chemistry in relation to industry. To this is joined technical training, comprising the study of tools, raw material, products, and everything belonging to practical work in the shop. The pupils visit industrial establishments and have to give a written account of their observations.

The time is divided as follows:

From 7 to 8 A. M., study; from 8 to 11, practical work in the shop; from 11 to 12, breakfast, recreation, gymnastics; from 12 to 2.30 P. M., work in the shop; at 2.30, for the first two years, recess and lunch. From 3 to 7 P. M., the time is occupied as indicated in the following table:

Municipal school for apprentices on the boulevard de la Villette.

Days of the week.	Year.	From 3 to 4 P. M.	From 4 to 5 P. M.	From 5 to 6 P. M.	From 6 to 7 P. M.
Monday	1st	Study	Geometry	French	Geometry.
	2d	Geometry	Study	Geometry	English.
	3d	Workshop	Workshop	Sketching	Law.
Tuesday	1st	Sketching and drawing.	Sketching and drawing.	Study	English.
	2d	Study of tools .	Study	Algebra	History and geography.
	3d	Workshop	Workshop	Mechanics	Descriptive geometry.

Municipal school for apprentices, &c.—Continued.

Days of the week.	Year.	From 3 to 4 P.M.	From 4 to 5 P.M.	From 5 to 6 P.M.	From 6 to 7 P.M.
Wednesday.	1st	History	Chemistry	French	Geometry.
	2d	Sketching and drawing.	Sketching and drawing.	Geometry	Physics.
	3d	Workshop	Workshop	Sketching and drawing.	Sketching and drawing.
Thursday...	1st	Reading	Geography	Arithmetic	English.
	2d	French	Chemistry	English	Arithmetic.
	3d	Workshop	Workshop	Physics and chemistry.	Technology.
Friday	1st	Sketching and drawing.	Sketching and drawing.	French	Geometry.
	2d	Mechanics	Book-keeping..	Geometry	Study.
	3d	Workshop	Workshop	Mechanics	Sketching.
Saturday ...	1st	Study of tools	Arithmetic	Physics	Study.
	2d	Sketching and drawing.	Sketching and drawing.	French	Study.
	3d	Workshop	Workshop	Sketching and drawing.	Sketching and drawing.

The attendance is very regular and the discipline excellent. The increase in the number of pupils since the organization of the school is remarkable. It was opened December 8, 1872. January 6, 1873, it had 17 pupils; May 1, 1873, 64; May 1, 1874, 104; May 1, 1875, 119; May 1, 1876, 129; May 1, 1877, 149; and May 1, 1878, 165.

In the school for apprentices on the rue Tournefort the regular course is of three years. During the first two years the same branches are taught as in the school on the boulevard de la Villette. The third year is especially devoted to sculpture and modelling. The workshop on the rue Tournefort was opened in 1873 with 13 pupils. In 1877 the number of pupils was 40.

There are, besides the above institutions, 237 factory schools, with 9,000 pupils of both sexes.

The number of children employed in different industrial establishments in Paris is, according to an investigation by the police authorities, 34,405, viz, 14,870 boys and 19,535 girls. Some of these children doubtless have received some elementary instruction. In order to accommodate these working children, several half-time schools have been established and others are to be.

Adult schools.—The courses for adults have always been popular in Paris. The law of April 10, 1867, found them in working order, and the encouragement given them under the administration of Mr. Duruy gave them an impetus which has not weakened. Despite the events of 1870-'71, 4,370 men and 1,803 women remained faithful attendants.

The following table shows the number of male and female attendants in the adult schools of Paris from 1867 to 1877:

Years.	Number of men in attendance—		Total.	Number of women in attendance—		Total.
	In lay schools.	In religious schools.		In lay schools.	In religious schools.	
1867.....	2,751	2,809	5,560	724	1,095	1,819
1868.....	3,198	3,112	6,310	804	1,612	2,416
1869.....	3,120	3,069	6,189	834	1,717	2,551
1870.....	2,814	2,494	5,308	792	1,625	2,417
1871.....	2,632	1,738	4,370	740	1,063	1,803
1872.....	3,871	2,465	6,336	979	1,727	2,706
1873.....	4,900	2,597	7,497	1,191	1,839	3,030
1874.....	4,824	2,607	7,431	1,466	2,053	3,519
1875.....	4,654	2,312	6,966	1,476	1,938	3,414
1876.....	4,697	2,279	6,976	1,499	1,952	3,451
1877.....	5,098	2,384	7,482	1,680	2,148	3,828

PRIMARY EDUCATION IN SCEAUX AND ST. DENIS (DEPARTMENT OF THE SEINE).

The population of these two arrondissements was 422,043 in 1876. The number of salles d'asile in 1877 was 85, that of public primary schools 190, and of private primary schools 233. The salles d'asile had 10,363 pupils, and the public and private primary schools 26,284. The adult schools counted 9,595 pupils.

CONDITION OF PRIMARY EDUCATION IN THE WHOLE DEPARTMENT.

In 1877 the number of pupils in salles d'asile and primary and adult schools was 235,016, and the number of public and private schools 2,296. The amount spent from 1867 to 1877 for school buildings is 58,398,926 francs. In Paris the budget for primary education has been increased nearly 50 per cent. since 1867.

Crime among children.—The following table shows the number of children arrested and the cause thereof from 1872 to 1877:

Years.	Causes.				Sex.		Total.
	Vagabondage.	Men d'ity.	Theft.	Various.	Males.	Females.	
1872.....	1,338	594	869	203	2,543	461	3,004
1873.....	1,087	459	783	82	2,092	319	2,411
1874.....	722	349	607	71	1,482	267	1,749
1875.....	832	282	548	118	1,568	212	1,780
1876.....	785	235	659	75	1,556	198	1,754
1877.....	844	222	578	72	1,547	169	1,716

IV.

EDUCATION IN ALGERIA AND FRENCH COLONIES.¹

ALGERIA.

Education in Algeria was only placed under the jurisdiction of the minister of public instruction in 1848. From 1818 to 1875 this country had a special administration, and it has only twice been included in the general French statistics of primary education, in 1863 and in 1872. Hence there are here peculiar difficulties in addition to the ordinary ones encountered in the comparison of school statistics.

It is useful, however, to give an outline of the progress achieved in primary education in Algeria from the foundation of the first French schools.

Even before the French occupation the Regency of Algiers possessed numerous schools. Each mosque, each holy place, had its school. These schools were supported by the mosques or by the revenues derived from endowments. The teaching was given by the *thaleb* or instructor to children from 6 to 15 years of age. The course of instruction embraced the reading of the Koran, the writing of Arabic letters, and arithmetic.

After the French conquest the majority of these schools were closed, one after another, because the revenues belonging to the mosques were nearly all united to the state domain. There were, however, still from 20 to 25 of these schools in Algiers in 1837. Very little was learned in the mosque schools; the administration complained, in 1837, that the teachers had done nothing to remedy the evil.

From the month of August, 1832, to October, 1848, public instruction was placed under the control of an inspector, who was under the jurisdiction of the civil director general. In 1832, 3 French schools were opened for the children of European parents. Another school was opened for young Israelites. This school had 40 pupils and one teacher, who was engaged in teaching the children to read and write French. Other schools were established for girls. A school of mutual instruction was attended chiefly by Israelites.

In 1837, when the first complete report on the condition of the French establishments in Algeria was laid before the Chambers, there were 22 schools, of which 8 were public schools for boys, without counting the schools for natives. The number of pupils in the French schools of all grades, which was 173 in 1832 and 537 in 1833, had risen to 1,202 in 1837. Of these 1,202 pupils 1,047 were in the primary schools. The schools

¹ From the *Statistique de l'enseignement primaire* (1876-1877).

for natives had 1,085 pupils. The number of 1,047 pupils for a European population of 16,770 gives 624 pupils for every 10,000 of these inhabitants.

In 1841 the number of pupils in primary schools had risen to 1,760; but the progress among the Mussulmans was not so rapid as had been expected; their new schools had only 40 pupils. In the French primary schools the number of pupils increased rapidly. In 1845 they had 3,824 pupils, or 4,156 inclusive of the secondary schools. In 1846 the number had risen to 6,071, in 1847 to 7,113, and at the end of the year 1848 to 8,108, or to 737 for every 10,000 European inhabitants.

A decree of May 30, 1848, placed the schools of Algeria under the jurisdiction of the French minister of public instruction, and on October 1 of the same year the administration was intrusted to a rector, assisted by an academic council and several inspectors. The rector had the power to appoint teachers.

The number of schools increased more rapidly from that time. In 1848, when the Academy of Algiers was created, there were 98 schools, 71 public and 27 private, and 8 salles d'asile, with a total number of 8,108 pupils. In 1850 there were 161 schools, with 7,538 pupils, and 31 salles d'asile, with 1,365 pupils. In 1863 there were 382 schools, with 21,535 pupils, and 89 salles d'asile, with 14,464 pupils; in all, 35,999 pupils, or 17.9 schools and 1,690 pupils for every 10,000 European inhabitants. In 1863 more than two-thirds of the schools were public (268 public and 114 private) and nearly two-thirds (265) were lay schools; 116 of all the schools were for children of both sexes.

The census of 1861 gives the number of 2,140 Mussulman schools, with 2,313 teachers and 26,499 pupils. Although a decree of August 15, 1875, made all the French school laws and regulations applicable to Algeria, the Mussulman schools remained under the control of the governor general.

In 1873 the number of primary schools, salles d'asile, &c., had risen to 626, and the number of pupils to 57,200. Of these, 501 were primary schools, with 42,736 pupils.

In 1877 the number of schools was 662—544 public and 118 private; 631 were French schools and 31 Arabic-French; 232 were schools for boys, 229 for girls, and 201 for both sexes; 488 were lay and 174 religious schools. Of the 51,592 pupils attending these schools, 26,217 were boys and 25,375 girls; 25,305 were French, 17,131 foreigners, 6,710 Israelites, and 2,446 Mussulmans. The adult schools numbered 141, with 4,758 pupils.

School savings banks have been established in Algeria as in other French departments. In 1877, 48 schools had savings banks, and the number of depositors was 2,439. At the beginning of the year 1879 the number of school savings banks was 71, the number of depositors 3,156, and the amount deposited \$22,437.

The following table shows the number of pupils in Algeria from 1832

to 1877 (including with primary and secondary schools, from 1850 to 1856 inclusive, salles d'asile, orphan asylums, &c.):

Years.	Number of pupils.	Years.	Number of pupils.	Years.	Number of pupils.
1832	173	1844	3,327	1859	25,447
1833	137	1845	4,156	1860	28,294
1834	566	1847	7,347	1861	30,862
1835	644	1848	8,334	1862	33,065
1836	801	1849	8,828	1863	35,999
1837	1,202	1850	10,551	1864	38,221
1838	1,334	1851	13,061	1865	39,852
1839	1,490	1852	15,115	1866	45,375
1840	1,628	1853	16,977	1875	58,710
1841	1,945	1854	19,960	1876	73,090
1842	2,260	1855	23,014	1877	79,494
1843	2,448	1856	25,980		

The following table shows the proportion of schools, teachers, and pupils to the total population:

Years.	European population.	Number of —			Number for every 10,000 inhabitants of —		
		Schools.	Teachers.	Pupils.	Schools.	Teachers.	Pupils.
1837	16,770	22	.....	1,047	13.1	.....	624
1839	23,023	21	.....	1,204	9.1	.....	523
1843	56,582	36	.....	2,233	6.4	.....	395
1846-47 ..	103,893	108	.....	6,071	10.4	.....	584
1850-51 ..	131,283	161	.....	7,538	12.3	.....	575
1855	155,607	282	.....	13,752	18.1	.....	884
1863	213,061	382	709	26,499	17.9	33.3	1,244
1873	279,691	501	1,002	42,736	17.9	35.8	1,528
1878	344,749	662	1,260	51,592	19.2	36.5	1,497

SENEGAL AND GOREE.

Population, 21,982, of whom 1,534 are Europeans or of European descent and 20,448 natives. The number of children between the ages of 6 and 13 is 4,777, of whom 1,953 are boys and 2,824 girls. The number of schools was 8 in 1878, of which 2 were lay and 6 religious schools; 7 were public and 1 private. This private school belonged to the Protestants. The lay schools had 3 teachers in 1878 and the religious schools 19. The total number of pupils was 1,387, 972 boys and 415 girls.

GABOON.

According to *Statistique de l'instruction primaire pour l'année 1863*, Gaboon had 1 religious private school for boys, with 80 pupils, and 1 religious private school for girls, with 74 pupils. Other details are wanting.

SAINTE-MARIE DE MADAGASCAR.

According to *Statistique de l'instruction primaire pour l'année 1863*, there were two religious private schools, viz, 1 for boys, with 376 pupils, and 1 for girls, with 550 pupils.

MAYOTTA.

The population of Mayotta was 11,025 in 1878. The number of children between 6 and 13 was 1,206, 584 boys and 622 girls. The colony had only two mission schools in 1878, viz, 1 for boys, with 22 pupils, and 1 for girls, with 23 pupils.

NOS-BEH.

This colony has a population of about 9,000 souls, of whom 100 are Europeans. There are two religious schools, one for boys and one for girls. In 1863, the schools were attended by 48 boys and 36 girls; in 1867, by 72 boys and 62 girls; in 1878, by 163 boys and 117 girls. The schools receive an annual state subsidy of 7,000 francs. An attempt was made in 1868 to establish a lay school, but without success.

REUNION.

Population, 193,241, 126,201 natives and 67,040 immigrants; number of children under 14 years of age, 42,040, viz, 21,902 boys and 20,138 girls. The number of schools is 159, viz, 60 for boys and 99 for girls; 94 are lay schools (viz, 39 for boys and 55 for girls) and 65 religious schools (viz, 21 for boys and 44 for girls); 115 are public (viz, 52 for boys and 63 for girls) and 44 private (viz, 8 for boys and 36 for girls). The total number of teachers is 273, viz, 96 in lay schools and 177 in religious schools. This number does not include the number of private schools for girls. The number of pupils is 10,791, of whom 3,648 attend the lay schools and 7,143 the religious schools, 9,606 the public and 1,185 the private schools.

PONDICHERRY.

The archives of the administration of Pondicherry do not contain any precise statement on the condition of institutions of learning before 1866. The following data have been extracted from the *Statistique de l'instruction primaire pour l'année 1863*:

French schools.—One lay school for boys, with 1 teacher and 120 pupils; 2 religious schools for girls, with 70 Indian and 50 European pupils.

Indian schools.—Four lay schools, with 303 pupils; two charitable institutions, with 95 children.

Statistics of 1866.—Population, 253,171, viz, 2,969 Europeans and 250,202 natives. The number of children between 6 and 13 was 59,531: 31,784 boys (447 Europeans and creoles and 31,337 natives) and 27,747

girls (580 Europeans and creoles and 27,167 natives). There were, in the same year, 17 religious schools for boys, with 61 teachers and 1,048 pupils, and 15 schools for girls, with 63 teachers and 880 pupils. The above schools are supported by the colonial government. Besides these, there are 2 lay private schools for girls, with 2 teachers and 26 pupils; 10 religious private schools for boys, with 13 teachers and 260 pupils; and 2 religious private schools for girls, with 30 teachers and 109 pupils.

Statistics of 1878.—Population, 276,531, viz, 2,600 European and 273,931 natives. The number of children between 6 and 13 was 69,447: 36,460 boys (331 Europeans and creoles and 36,129 natives) and 32,987 girls (317 Europeans and creoles and 32,670 natives). The schools entirely supported by the colonial government were: 2 lay schools for boys, with 7 teachers and 171 pupils; 9 religious schools for boys, with 53 teachers and 1,481 pupils; 13 religious schools for girls, with 49 teachers and 1,226 pupils. The colonial government also gives a subsidy to one religious private school for girls, with 3 teachers and 48 pupils.

CHANDERNAGORE.

According to the *Statistique de l'instruction primaire pour l'année 1863*, Chandernagore had one religious school for boys, with 110 pupils, and one religious school for girls, with 50 pupils.

CARRICAL.

The *Statistique de l'instruction primaire pour l'année 1863* gives 7 public schools for boys, with 212 pupils; 80 private schools for boys and for both sexes, with 1,595 pupils, and 2 public schools for girls, with 194 pupils.

YANAON.

Yanaon had one religious school for boys in 1863, with 52 pupils.

MAHÉ.

In 1863 Mahé had one lay school and one religious school, with 118 pupils in all.

COCHIN CHINA.

The population of Cochin China was 1,575,202 in 1878, viz: 1,143 Europeans and 1,574,059 natives. The number of children between 6 and 13 was 208,808, viz, 103,200 boys and 105,608 girls. There were, at the same period, 19 lay schools and 14 religious schools; 18 schools were public and 15 private. The total number of pupils was 2,688, viz, 2,008 boys and 680 girls.

NEW CALEDONIA AND DEPENDENCIES.

The total population was 54,417 in 1878, of whom 35,301 were natives. The number of children under 14 was 1,459. The number of schools

for boys was 12, viz, 6 public and 6 private. The public schools had 349 pupils and the private schools 320. The girls' schools numbered 10, viz, 3 public and 7 private. The public schools had 423 pupils, and the private schools 302. The total number of pupils in all the schools is therefore 1,394.

OCEANIA AND THE ISLANDS OF THE PROTECTORATE.

The following data are from *Statistique de l'instruction primaire pour l'année 1863*: 3 public schools for boys, with 131 pupils; 2 private schools for boys, with 106 pupils; 3 public schools for girls, with 155 pupils; 2 private schools for girls, with 123 pupils; 24 public schools for both sexes, with 826 boys and 699 girls. Total number of schools, 34; total number of pupils, 2,040, viz, 1,063 boys and 977 girls.

SAINT PIERRE AND MIQUELON.

Population in 1878, 3,913; number of children between 6 and 13, 847; number of schools, 8, viz, 6 public and 2 private; number of pupils, 847.

GUADELOUPE.

In 1863, Guadeloupe had 1 public lay school for boys, with 55 pupils; 22 public religious schools for boys, with 1,654 pupils; 9 private lay schools for boys, with 244 pupils; 2 religious lay schools for boys, with 185 pupils; 1 public lay school for girls, with 35 pupils; 21 public religious schools for girls, with 1,168 pupils; 9 religious private schools for girls, with 256 pupils; 3 private lay schools for girls, with 195 pupils; and 4 private lay schools for both sexes, with 84 pupils. Total number of schools, 72; total number of pupils, 3,876.

MARTINIQUE.

The population of Martinique was 161,532 in 1878, viz, 12,625 Europeans and 148,907 natives. The number of children between 6 and 13 was 16,046, viz, 8,684 boys and 7,362 girls. The number of schools was 136; the number of teachers, 219; and the number of pupils, 11,870.

GUIANA.

According to the *Statistique de l'instruction primaire pour l'année 1863*, Guiana had 1 higher public school for boys, with 205 pupils; 1 public elementary school for boys, with 212 pupils; 1 higher public school for girls, with 331 pupils; 2 public elementary schools for girls, with 447 pupils; and 4 public schools for both sexes, with 53 boys and 50 girls. Total number of schools, 9; total number of pupils, 1,298.

SECONDARY INSTRUCTION.

71-72

199-200

SECONDARY INSTRUCTION.

Following is an abstract of the official report for 1876:¹

INTRODUCTION.

Since the creation of the University of France, in the beginning of the present century, only two complete statistical reports of secondary education have been published: the first in 1843, under the ministry of M. Villemain, and the second (for the year 1865) in 1868, under the ministry of M. Duruy.

During the last few years, and especially since 1871, a strong impetus has been given to all phases of secondary education. The special branches prescribed by the law have been inserted in the course of study; new lycées and colleges have been opened; both state and city authorities have appropriated large amounts of money for the reconstruction, enlargement, and hygienic improvement of school buildings; the modified and extended course of study allows more time for modern languages, history, and geography; scientific collections have been enlarged and completed, and the salaries of professors have been raised; finally, military exercises, more frequent gymnastic lessons, improvements in food and clothing, have aided the physical development of the pupils and more satisfactorily provided for their well being.

DEFINITION OF SECONDARY SCHOOLS IN FRANCE.

There are two kinds of secondary schools, public and private. The public secondary schools are the lycées—under the Restoration called royal colleges—and the communal colleges. The former are maintained by the state, the latter by the communes, but they may be aided by the state. In both, the instruction is classical and special. Special instruction includes the modern languages and natural sciences. No one is allowed to teach in a public secondary school unless he furnishes proof of capacity. This generally takes the form of a university degree or a certificate of capacity of the superior normal school. Although the lycées are the strongholds of the classics, great attention is paid to natural sciences and modern languages. In the communal colleges the special branches occupy still more time.

The private secondary schools are of two kinds, lay and ecclesiastical. The lay private schools are rapidly decreasing in number, while the

¹ Statistique de l'enseignement secondaire en 1876. Paris, 1878.

ecclesiastical schools show an increase. The latter schools are either under the control of the bishops or the religious orders, among which the Jesuits held the chief place until their order was suppressed in France and the French colonies by a decree of the President of the Republic dated March 29, 1880. A few private secondary schools are under the control of the ministers of the non-Catholic denominations.

All the private schools are subject to government inspection and to certain state laws relative to the sanitary condition of buildings, the professional capacity of the principals, and the internal discipline.

Both public and private secondary schools admit boarders and day scholars.

PRESENT CONDITION OF THE NATIONAL LYCÉES.

The number of national lycées is 86; 81 of these establishments are in operation, the other 5, created by recent decrees, have not yet been organized.

The lycées have been established during the following periods: 1802 to 1815, 34; 1815 to 1830, 2; 1830 to 1848, 18; 1848 to 1870, 27; 1870 to 1876, 5. In 1871 the lycées of Metz, Strasburg, and Colmar ceased to belong to France. The lycée of Vanves, about two miles from Paris, is exclusively for young pupils; it is, as it were, the nursery of the lycées of Paris. Several lycées have, in their immediate vicinity, a preparatory college for young pupils, while others have them in distant parts of the cities or even in the country.

The following table shows the national lycées in alphabetical order:

Table showing the national lycées in alphabetical order; also, the dates of their establishment and the class to which they belong.

No.	National lycées.	Academic circumscription.	Year of establishment.	Classification in 1876.
1	Paris: Louis-le-Grand.....	Paris.....	1802	} Unclassified.
2	Henri IV.....	Paris.....	1803	
3	Saint-Louis.....	Paris.....	1812	
4	Charlemagne.....	Paris.....	1803	
5	Fontanes.....	Paris.....	1803	
6	Vanves.....	Paris.....	1864	
7	Versailles.....	Paris.....	1806	
8	Agen.....	Bordeaux.....	1854	IV
9	Albi.....	Toulouse.....	1862	IV
10	Alençon.....	Caen.....	1846	IV
11	Alger (Algiers).....	Algiers.....	1848	II
12	Amiens.....	Donai.....	1803	II
13	Angers.....	Rennes.....	1803	III
14	Angoulême.....	Poitiers.....	1840	II
15	Auch.....	Toulouse.....	1833-1838	IV
16	Avignon.....	Aix.....	1803	IV
17	Bar-le-Duc.....	Nancy.....	1854	IV
18	Bastia.....	Aix.....	1838	IV
19	Bayonne.....	Bordeaux.....	1874	{ Not yet classified.

Table showing the national lycées in alphabetical order, &c.—Continued.

No.	National lycées.	Academic circumscription.	Year of establishment.	Classification in 1876.
20	Belfort	Besançon	1873	IV
21	Besançon	Besançon	1803	II
22	Bordeaux	Bordeaux	1803	I
23	Bourg	Lyon	1854	IV
24	Bourges	Paris	1803	IV
25	Brest	Rennes	1848	II
26	Caen	Caen	1803	II
27	Cahors	Toulouse	1803	IV
28	Carcassonne	Montpellier	1853	III
29	Chambéry	Chambéry	1860	IV
30	Charleville	Douai	1876	{ Not yet classified.
31	Châteauroux	Poitiers	1853	
32	Chaumont	Dijon	1843	
33	Clermont	Clermont	1803	II
34	Constantine	Algeria	1876	{ Not yet classified.
35	Coutances	Caen	1853	
36	Dijon	Dijon	1803	
37	Douai	Douai	1803	II
38	Évreux	Caen	1854	IV
39	Grenoble	Grenoble	1803	III
40	Guéret	Clermont	1869	{ Not yet classified.
41	Havre (Le)	Caen	1861	
42	Laval	Rennes	1841	
43	Lille	Douai	1845	II
44	Limoges	Poitiers	1803	III
45	Lons-le-Saunier	Besançon	1863	IV
46	Lorient	Rennes	1863	III
47	Lyon	Lyon	1803	I
48	Mâcon	Lyon	1841	IV
49	Mans (Le)	Caen	1850	IV
50	Marseilles	Aix	1802	I
51	Montauban	Toulouse	1864	IV
52	Mont-de-Marsan	Bordeaux	1859	IV
53	Montpellier	Montpellier	1803	I
54	Moulins	Clermont	1802	III
55	Nancy	Nancy	1803	I
56	Nantes	Rennes	1803	II
57	Nevers	Dijon	1860	IV
58	Nice	Aix	1860	III
59	Nîmes	Montpellier	1803	II
60	Niort	Poitiers	1858	IV
61	Orléans	Paris	1803	III
62	Pau	Bordeaux	1803	III
63	Périgueux	Bordeaux	1845	IV
64	Poitiers	Poitiers	1803	III
65	Pontivy	Rennes	1803	IV
66	Puy (Le)	Clermont	1835	IV
67	Reims	Paris	1803	II
68	Rennes	Rennes	1803	III
69	Rochelle (La)	Poitiers	1843	IV
70	Roche-sur-Yon (La)	Poitiers	1838	IV
71	Rodez	Toulouse	1803	IV
72	Rouen	Caen	1803	I
73	Saint-Brieuc	Rennes	1848	IV
74	Saint-Étienne	Lyons	1840	IV
75	Saint-Omer	Douai	1845	IV
76	Saint-Quentin	Douai	1853	III
77	Sens	Dijon	1854	IV

Table showing the national lycées in alphabetical order, &c.—Continued.

No.	National lycées.	Academic circumscription.	Year of establishment.	Classification in 1876.
78	Tarbes	Toul	1853	IV
79	Toulon	Aix	1861	III
80	Toulouse	Toulouse	1803	I
81	Tournon	Grenoble	1820	IV
82	Tours	Poitiers	1830	III
83	Troyes	Dijon	1853	III
84	Valenciennes	Douai	1875	{ Not yet classified.
85	Vendôme	Paris	1847	
86	Vesoul	Besançon	1859	

Income and expenditure of the lycées.—The total income of the lycées in 1876 amounted to 24,028,867 francs. Of this amount, 15,803,736 francs were derived from fees, and the rest from state, departmental, and communal subsidies, &c.

The charges for board differ according to the size of the city and the age of the pupil. At Paris, the charges are 1,000 francs in the elementary division, 1,200 francs in the grammar division, and 1,400 to 1,500 francs in the superior division. At Lyons the charges are, for the same grades, 900, 950, and 1,000 to 1,100 francs; at Orléans, 750, 800, and 850 francs; at Vendôme, 650, 700, and 750 francs; at Le Puy, 550, 600, and 650 francs.

The tuition fees are from 110 to 300 francs in the larger and from 70 to 140 francs in the smaller cities.

The total expenditure in 1876 amounted to 23,359,384 francs. Of this amount, 11,477,627 francs were for salaries.

Functionaries of the national lycées.—The 2,349 functionaries of the national lycées are divided into the personnel of the administration and the teaching corps. The administration is in the hands of head masters (provisseurs), chaplains (aumôniers), stewards (économés), and general superintendents (surveillants généraux). They take no part in teaching. Their duty is to admit the pupils, correspond with the parents, keep the accounts, manage the household, and maintain the discipline of the school.

The teaching corps consists of persons of different degrees of rank, for which no corresponding names can be given. The following are the titles of teachers of the lycées, with an approximate English translation: (1) Professeurs titulaires (full professors). (2) Professeurs divisionnaires (division professors). (3) Chargés de cours de l'enseignement classique (special teachers of the classics). (4) Professeurs agrégés de l'enseignement spécial (professors agrégés of special instruction). The agrégé is an instructor in the lycées or universities, originally engaged to fill a sudden vacancy in the corps of teachers, but now occupying a

position preparatory to the titular or full professorship. In the lycée his rank is equivalent to that of regular teacher; in the university he is only adjunct professor (*professeur suppléant*), and can obtain the full title only by higher qualifications, such as the rank of doctor or of member of the Institute. The *agrégé* receives his rank in a special branch, for which he must pass a severe examination, and he can teach no other branch until he has passed an examination on the same. (5) *Chargés de cours de langues vivantes* qui ne sont ni licenciés ni pourvus du *certificat d'aptitude* (unlicensed teachers of modern languages). (6) *Maîtres répétiteurs* (ushers). (7) *Maîtres auxiliaires* (supplementary teachers). (8) In addition to the above there is in each lycée a *censeur*, or superintendent of studies and discipline.

Besides these, the lycées employ several elementary teachers for the lower classes and teachers of gymnastics, singing, and drawing.

Salaries of functionaries of the lycées.—The following table shows the salaries of all the functionaries of the national lycées in 1876:

Functionaries of national lycées.	Classes.	Lycées of—		Lycées of the departments.			
		Paris.	rsailles.	Class I.	Class II.	Class III.	Class IV.
Head masters (proviseurs):		<i>Francs.</i>	<i>Francs.</i>	<i>Francs.</i>	<i>Francs.</i>	<i>Francs.</i>	<i>Francs.</i>
At Paris and Versailles.....	I	9,000	9,000	7,500	7,000	6,500	6,000
In the departments.....	II			7,000	6,500	6,000	5,500
Censors (censeurs):							
At Paris and Versailles.....	I	8,000	7,500	5,600	4,600	4,200	4,000
In the departments.....	II			5,400	4,400	4,000	3,800
	III			5,200	4,200	3,800	3,600
Full professors (professeurs titulaires).	I	7,500	7,000	5,000	4,000	3,600	3,400
	II	7,000	6,500	4,800	3,800	3,400	3,200
	III	6,500	6,000	4,600	3,600	3,200	3,000
	IV	6,000	5,500				
Divisional professors (professeurs divisionnaires).	I	5,500	5,000	4,800	3,800	3,400	3,200
	II	5,000	4,500	4,400	3,400	3,000	2,800
	III			4,000	3,000	2,600	2,400
Special teachers of the classics (chargés de cours de l'enseignement classique).	I			4,800	3,800	3,400	3,200
	II			4,400	3,400	3,000	2,800
	III			4,000	3,000	2,600	2,400
Professors agrégés for special branches (professeurs agrégés de l'enseignement spécial).	I			4,600	3,600	3,200	3,000
	II			4,200	3,200	2,800	2,600
	III			3,800	2,800	2,400	2,200
Unlicensed teachers of modern languages (chargés de cours de langues vivantes).	I			3,500	3,000	2,800	2,700
	II			3,000	2,500	2,300	2,200
	III			2,700	2,200	2,000	2,000
Professors of the two lower classes (seventh and eighth).		2,500	2,500	2,000	2,000	2,000	2,000
Elementary teachers		1,400	1,400	1,000	1,000	1,000	1,000
Ushers (maîtres répétiteurs)		1,500	1,500	1,200	1,200	1,200	1,200
Supplementary teachers (maîtres auxiliaires).				400	400	400	400
Drawing teachers		2,500	2,500	2,000	2,000	2,000	2,000

Chaplains receive from 2,000 to 4,500 francs; stewards, from 2,400 to 3,700 francs; and general superintendents, from 1,800 to 3,000 francs.

Table showing the number of students in the lycées and the preparatory colleges attached to them in 1876.

Lycées.	Number of—		Total.
	Boarders.	Day scholars.	
Louis-le-Grand, Paris	606	617	1, 223
Henri IV, Paris	503	273	776
Saint-Louis, Paris	559	456	1, 015
Fontanes, Paris	268	1, 328	1, 596
Charlemagne, Paris .....	.....	837	837
Vanves, Paris	520	26	546
Versailles, Paris	410	291	701
Agen	190	117	307
Albi	161	173	334
Alençon	173	145	318
Alger (Algiers)	375	554	929
Amiens	299	154	453
Angers	177	204	381
Angoulême	353	263	616
Auch	191	191	382
Avignon	125	105	230
Bar-le-Duc	263	157	420
Bastia	136	338	474
Belfort	389	169	558
Besançon	217	271	488
Bordeaux (lycée)	370	430	800
Bordeaux (preparatory college)	202	.....	202
Bourg	244	91	335
Bourges	184	142	326
Brest	237	364	601
Caen	305	258	563
Cahors	130	116	246
Carcassonne	445	153	598
Chambéry	107	187	294
Châteauroux	152	115	267
Chaumont	171	128	299
Clermont	311	222	553
Coutances	245	128	373
Dijon	235	220	455
Donai	353	127	480
Évreux	196	68	264
Grenoble	216	229	445
Le Havre	294	232	526
Laval	310	134	444
Lille	367	328	695
Limoges	168	271	439
Lons-le-Saunier	188	109	297
Lorient	116	346	462
Lyon (lycée)	408	704	1, 112
Lyon (preparatory college)	173	8	181
Mâcon	177	137	314
Mans (Le)	182	199	381
Marseilles (lycée)	312	591	903
Marseilles (preparatory college)	70	.....	70
Montauban	127	173	300
Mont de Marsan (lycée)	313	35	348
Mont de Marsan (preparatory college)	52	28	80
Montpellier (lycée)	262	351	613

Table showing the number of students, &c.—Continued.

Lycées.	Number of—		Total.
	Boarders.	Day scholars.	
Montpellier (preparatory college)	264	46	310
Moulins	364	127	491
Nancy	380	399	779
Nantes	249	307	556
Nevers	208	162	370
Nice	236	282	518
Nîmes	232	364	596
Niort	197	169	366
Orléans	243	232	475
Pau	206	238	444
Périgueux	186	187	373
Poitiers	206	189	395
Pontivy	108	175	283
Puy (Le)	156	135	291
Reims	318	207	525
Rennes	217	305	522
Rochelle (La)	158	171	329
Roche-sur-Yon (La)	97	112	209
Rodez	155	120	275
Rouen	518	341	859
Saint-Brieuc	159	117	276
Saint-Étienne	213	231	444
Saint-Omer	197	119	316
Saint-Quentin	202	219	421
Sens	177	62	239
Tarbes	142	157	299
Toulon	159	322	481
Toulouse	485	615	1,100
Tournon	136	68	204
Tours	243	193	436
Troyes	238	171	409
Vendôme	123	85	208
Vesoul	211	155	366
Total	20,920	20,075	40,995

Classification of pupils.—Of the 40,995 pupils of the lycées and their preparatory colleges, 32,299 were in the classical department and 8,696 in the special or modern department.

The following table shows the number of lycées and the number of pupils from 1809 to 1876:

Years.	Number of lycées.	Number of pupils.	Years.	Number of lycées.	Number of pupils.	Years.	Number of lycées.	Number of pupils.
1809	35	9,068	1815	36	9,265	1821	38	12,058
1810	36	9,310	1816	36	8,613	1822	38	12,114
1811	36	10,926	1817	36	9,754	1823	38	12,295
1812	36	12,185	1818	36	10,640	1824	38	12,519
1813	36	14,492	1819	36	11,064	1825	38	13,327
1814	36	12,110	1820	38	11,981	1826	38	13,582

Years.	Number of lycées.	Number of pupils.	Years.	Number of lycées.	Number of pupils.	Years.	Number of lycées.	Number of pupils.
1827	38	13,904	1844	48	20,082	1861	73	28,375
1828	38	14,553	1845	50	21,692	1862	75	30,330
1829	38	15,087	1846	51	22,311	1863	75	30,669
1830	38	14,920	1847	53	23,207	1864	76	31,615
1831	39	14,451	1848	56	22,624	1865	77	32,630
1832	39	13,598	1849	56	21,938	1866	78	34,435
1833	39	14,101	1850	56	20,453	1867	81	36,112
1834	40	14,127	1851	57	19,269	1868	82	37,725
1835	41	14,171	1852	58	19,543	1869	82	37,691
1836	41	14,869	1853	61	20,361	1870	83	36,651
1837	41	15,151	1854	64	21,623	1871	80	35,018
1838	41	15,130	1855	64	22,746	1872	80	36,756
1839	42	16,252	1856	65	24,752	1873	81	37,714
1840	44	16,952	1857	68	26,118	1874	81	38,066
1841	44	17,277	1858	69	26,422	1875	81	38,492
1842	46	18,697	1859	70	26,705	1876	81	40,995
1843	48	19,519	1860	72	27,372			

Course of study.—The course of study in all the lycées is the same. The programmes are drawn up and text books selected by the ministry of public instruction.

The present course of study was approved July 23, 1874, with the exception of that part relating to religious instruction and to the special course of higher mathematics, both of which were regulated by decree of March 24, 1865. According to the decree of 1865 religious instruction is to be given one hour a week in each class. Day scholars may attend if parents so desire.

The special course of higher mathematics consists of arithmetic, algebra, geometry, trigonometry, cosmography, mechanics, statics, physics, and chemistry.

The following is the course of study approved by decree of July 23, 1874:

ELEMENTARY DIVISION.

Preparatory or ninth class. French: reading, writing, orthography, and elementary grammar, Bible history and geography of the Holy Land, elements of physical geography of France and of the department, and arithmetic.

Eighth class. French: reading, writing, recitation, grammar, and orthography; Latin: declensions and conjugations, explanation of Latin authors, translations from Latin into French and vice versa; modern languages (German or English): elements of grammar, reading, explanation of easy authors, formation of easy sentences, sacred history; geography: the five parts of the world; practical arithmetic: weights and measures.

Seventh class. French: writing, recitation, explanation of words and sentences, grammar, and orthography; Latin: grammar, review of the elements, syntax, explanation of authors, translations; modern languages (German or English): elements of grammar, explanation and recitation of easy authors, reading and conversation; summary history of France; elementary geography of France; practical arithmetic continued: decimals, the metric system.

Text books for the elementary division are Évangiles des dimanches, Morceaux

choisis des auteurs classiques, Fénelon's Fables, La Fontaine's Fables, Epitome Historiæ Sacræ, De Viris Illustribus Urbis Romæ, Appendix de Diis et Heroibus Poeticis.

GRAMMAR DIVISION.

Sixth class. French: grammar, explanation and recitation of authors, reading, orthography, composition; Latin: grammar, review of the elements, easy syntax, reading of Rollin's maxims, Selectæ e Profanis Scriptoribus Historiæ, Phædrus's Fables, and translations; Greek: grammar, declensions and conjugations, explanation of authors, reading of Æsop's fables, translations; modern languages (German or English): grammar continued, explanation and recitation of authors, reading and conversation, translations; ancient history; geography of Asia, Africa, America, and Australia; practical arithmetic continued.

Fifth class. French: grammar, explanation and recitation of authors, reading of Fénelon's Dialogues des morts and Racine's Esther, orthography and composition; Latin: review of grammar, syntax, explanation and recitation of Selectæ e Profanis Scriptoribus Historiæ, Justinus, Cornelius Nepos, Ovid's Metamorphoses, with translations; Greek: declensions and conjugations, elements of syntax, reading of extracts from easy authors, translations; modern languages (English or German): grammar continued, explanation and recitation of authors, reading and conversation, translations; history of ancient Greece; general geography of Europe, except France; practical arithmetic continued.

Fourth class. French: grammar, explanation and recitation of authors, reading of Fénelon's Télémaque and Racine's Athalie, orthography and composition; Latin: review, elements of Latin prosody, reading and explanation of Cicero's select letters, Cæsar's De Bello Gallico, Quintus Curtius, Ovid's Metamorphoses, Virgil's Æneid (books I and II), and translations; Greek: grammar reviewed and continued, reading and explanation of Greek authors (Gospel of St. Luke, Xenophon, Plutarch, Herodotus), translations and exercises; modern languages (German or English): grammar continued, reading and explanation of authors, conversation, translations; ancient Roman history; geography of France; arithmetic; first principles of geometry.

SUPERIOR DIVISION.

Third class. French: language and literature, reading of selections from Voltaire's Charles XII, Montesquieu's Considérations sur la grandeur et la décadence des Romains, and Boileau's Satires and Épisodes du Lutrín, with composition and analysis; Latin: Review of grammar, prosody, reading and explanation of Cicero (Pro Archia Poeta, De Signis, De Supplicis), Sallust, Terence, Virgil, translations; Greek: review of grammar, reading and explanation of Isocrates, Plutarch, Lucian, Herodotus, Homer, and selections from the discourses of the Greek fathers, translations; modern languages (German or English): grammar (review of syntax, formation of words), elements of prosody, reading and explanation of authors and conversations, dictations, translations; history of Europe from the year 395 to 1270; geography of Europe; arithmetic; geometry.

Second class. French: language and literature, reading and explanation of Bossuet (Discours sur l'histoire universelle), La Bruyère, Massillon (Petit Carême), Boileau (Épîtres), and selections from other authors, with composition and analysis of these; Latin: explanation and recitation of Narrationes, Cicero (In Catilinam, De Senectute, De Amicitia, Somnium Scipionis), Tacitus (Agricola), Virgil, Horace's Odes, selections from the writings of the Latin fathers, translations and compositions in prose and poetry; Greek: explanation and recitation of Demosthenes, Plato, Homer, and Euripides, and translations; modern languages (German or English): grammar (idioms, proverbs), elements of prosody, reading and explanation of authors, conversation, oral and written translations and compositions; history of Europe from 1270 to 1610; geography of Asia, Africa, America, and Australia; algebra; geometry; natural history.

Class in rhetoric. French: elements of rhetoric, literature, reading of Pascal (*Pensées*), Bossuet (*Oraisons funèbres*), La Bruyère, Fénelon (*Lettre à l'Académie française*, *Sermon pour l'Épiphanie*), Buffon (selections, *Discours sur le style*), Voltaire (*Siècle de Louis XIV*), Boileau (*Art poétique*), La Fontaine's *Fables*, discourses and compositions, and analysis; Latin: reading and explanation of the *Conciones*, Cicero, Tacitus, Virgil, Horace, Lucretius, Plautus, translations, compositions in prose and poetry, discourses, analysis; Greek: reading and explanation of Demosthenes, Plato, Aristotle, Homer, Sophocles, Aristophanes, translations and analysis; modern languages (German or English): composition, reading, conversation, oral and written translations; history of Europe from 1610 to 1789, with a brief review of French history previous to the year 1610; geography of France and her colonies; general review of geography; geometry; cosmography.

Class of philosophy. Object of philosophy, its principal divisions, and its relations with other sciences; psychology; logic; metaphysics; moral philosophy; history of philosophy; Latin and French dissertations; reading of philosophical works in Greek, Latin, and French; modern languages, the same as in the class of rhetoric; contemporary history and geography; review of arithmetic, algebra, geometry, and cosmography; physics; chemistry; natural history.

Drawing, singing, and gymnastics are obligatory in all the classes of the lycées.

PRESENT CONDITION OF COMMUNAL COLLEGES.

The number of communal colleges was 252 in 1876, against 251 in 1865. Their total income in 1876 amounted to 13,150,687 francs and the expenditure to 12,358,401 francs.

The charges for board in the communal colleges are, at Paris, 629 francs; at Bordeaux, 516 francs; at Toulouse, 468 francs. The tuition fees are, at Paris, 104 francs; at Bordeaux, 108 francs; at Toulouse, 102 francs.

The state subsidies amounted to 473,558 francs in 1876 and the communal subsidies to 3,492,801 francs.

The communal colleges do not all have the higher classes. Some have all except the highest class, some the two or three lowest classes, and three have only the preparatory class. Only 142 of the 251 colleges have a complete course and prepare for the degree of bachelor of letters and bachelor of science.

Salaries of teachers.—The principals receive from 2,600 to 7,000 francs, but if the college is managed on their own account they have only the profits derived from the boarding establishment.

The salaries of full professors range from 6,000 to 7,500 francs; of division professors, from 5,000 to 5,500 francs; of professors of physics, from 1,400 to 3,000 francs; of elementary professors, from 500 to 2,500 francs; of teachers of modern languages, from 1,000 to 3,000 francs.

The teaching force of the communal colleges consists of 252 principals and 2,650 professors and assistants.

The total number of pupils of the communal colleges was 38,236 at the end of 1876. Of this number, 14,992 were in the classical department, 14,012 in the department of modern languages and natural sciences, and 9,232 in the primary department. In 1865, there were 33,038 pupils,

viz, 15,943 in the classical, 11,880 in the modern language, and 5,215 in the primary department.

The course of study in the communal colleges is substantially the same as in the lycées, but the instruction in the latter is generally considered more thorough than in the former.

PRIVATE SECONDARY SCHOOLS.

The number of private secondary schools was 803 in 1876 against 935 in 1865. Of these 803 schools, 494 were under lay and 309 under ecclesiastical control. There is an increase of 31 ecclesiastical and a decrease of 163 lay institutions since 1865.

The total number of pupils in 1876 was 78,065, against 77,906 in 1865. Of the 78,065 pupils in 1876, 31,249 were in lay and 46,816 in ecclesiastical institutions. The decrease in the number of pupils in lay schools amounts to 11,760 since 1865, while the increase in the ecclesiastical schools during the same period amounts to 11,919.

Of the ecclesiastical secondary schools the different religious orders had 89 in 1876, against 43 in 1865. The total number of pupils in these 89 schools was 19,961.

The following departments had the largest number of private secondary schools in 1876: Seine, 157; Bouches-du-Rhône, 39; Rhône, 34; Gironde, 33; Seine-et-Oise, 25; Haute-Garonne, 23; Nord, 20; Pas-de-Calais, 19; Seine-Inférieure, 19; Hérault, 16; Aisne, 15.

Seventy-two of the 803 private secondary schools received a subsidy from the communes.

The total number of teachers in private secondary schools was 6,261 in 1876, viz, 2,500 (115 of whom were priests) in the lay and 3,761 (2,946 of whom were priests) in the ecclesiastical institutions.

The average charges for board and tuition were in lay institutions 654 francs and in ecclesiastical institutions 343 francs a year. Half boarders paid 336 in lay and 342 francs in ecclesiastical institutions; day scholars, 119 francs in lay and 113 in ecclesiastical institutions.

Table showing the total expenditure for secondary education in 1876.

Amounts contributed by—	Francs.
The state	5, 568, 336
Departments	468, 272
Communes	4, 280, 247
Families	65, 605, 929
Total	75, 922, 784

In 11 departments the expenses exceeded 1,000,000 francs:

Departments.	Francs.
Seine.....	20,182,431
Nord.....	2,699,396
Gironde.....	2,689,758
Rhône.....	1,892,264
Haute-Garonne.....	1,837,678
Pas-de-Calais.....	1,550,662
Bouches-du-Rhône.....	1,553,150
Seine-Inférieure.....	1,420,509
Somme.....	1,392,501
Seine-et-Oise.....	1,309,993
Hérault.....	1,268,205

In 21 departments the expenses for secondary education ranged from 600,000 to 1,000,000 francs; in 18 departments, from 500,000 to 600,000 francs; in 25 departments, from 304,000 to 500,000 francs; in 13 departments, from 100,000 to 300,000 francs; in 2 departments, Lozère and Hautes-Alpes, the expenses were less than 100,000 francs.

The total expenditure for secondary education in France was only 64,464,573 francs in 1865. There was thus an increase in 1876 of 11,458,211 francs.

The average cost for boarders in lycées was 753 francs, in the communal colleges 518 francs, in private lay schools 654 francs, and in private ecclesiastical schools 543 francs. The average tuition fees amounted to 113 francs in the lycées, 72 francs in the communal colleges, 119 francs in the lay schools, and 133 francs in the ecclesiastical schools.

COMPARISON OF THE CONDITION OF PUBLIC SECONDARY SCHOOLS IN 1865 AND IN 1876.

In 1865 the number of establishments was 328, 77 lycées and 251 colleges; in 1876 their number was 333, 81 lycées and 252 communal colleges. There is thus an increase of 5 establishments, 4 lycées and 1 college. Three lycées and 15 colleges were lost through the Franco-Prussian war. The number of pupils in 1865 was 65,668, 30,728 boarders and 34,940 day scholars; in 1876 the number was 79,231, 36,472 boarders and 42,759 day scholars. There were thus, on an average, 200 pupils for every school in 1865 and 238 in 1876. The number of pupils who received gratuitous instruction was 3,565 in 1865 and 7,542 in 1876.

COMPARISON OF PUBLIC AND PRIVATE SECONDARY SCHOOLS.

The total number of secondary schools in France was 1,136 in 1876, viz, 81 lycées, 252 communal colleges, 494 private lay schools, and 309 private ecclesiastical schools. These institutions had 153,324 pupils: in lycées, 37,477; in colleges, 37,782; in private lay schools, 31,249; in private ecclesiastical schools, 46,816.

In the department of the Seine there is 1 secondary school to every 14,700 inhabitants; Bouches-du-Rhône, 1 to 12,939; Basses-Alpes, 1 to 15,129; Hérault, 1 to 17,802; Haut-Rhin, 1 to 17,150; Haute-Garonne, 1 to 18,374; Alpes-Maritimes, 1 to 18,509; Rhône, 1 to 20,146; Gironde, 1 to 19,871.

In some departments secondary education is not so well developed. Haute-Loire has 1 secondary school to every 156,860 inhabitants; Loire, 1 to 147,653; Vendée, 1 to 102,945; Allier, 1 to 101,445; Cher, 1 to 86,403; Finistère, 1 to 83,263; Côtes-du-Nord, 1 to 78,869; Cantal, 1 to 77,028; Corrèze, 1 to 77,881; Ain, 1 to 73,092.

As the population of France (including Algiers) in 1870 was 37,337,669 and the number of pupils of secondary schools 153,324, there was 1 pupil to every 243 inhabitants.

RECENT CHANGES IN THE PROGRAMME OF SECONDARY SCHOOLS.

The present government has in view the reform of all grades of schools. For the reform of primary schools two bills have passed the Chambers, the bill making education obligatory and gratuitous and the bill requiring every teacher to be provided with a government certificate of capacity. A third bill, making primary education unsectarian, is still pending. Secondary instruction has been improved by several ministerial decrees, the most recent of which is that of August 2, 1880, in which the minister makes the programme prepared by the new superior council of public instruction obligatory for the lycées and communal colleges. Following is a synopsis of the programmes adopted by the superior council of public instruction :

After having prepared the course of study for the secondary schools, the superior council of public instruction has laid down the following principles on which the studies are henceforth to be conducted :

(1) In all the courses of study and from the first start in the lower classes, the object of the instruction shall be to develop the judgment of the child as well as his memory and to drill him in expressing his thoughts.

(2) The study of grammar should not be left to the diversity of methods and books. The pupil must have, for each period and for each language, a grammar adapted to his age and knowledge.

(3) In the elementary classes only the indispensable rules are to be studied. This is in conformity with the principle that grammar must be learned through the language, and not the language through the grammar. The teacher must go from the text to the rule, from the example to the formula, from the concrete to the abstract.

(4) For the same reasons an end must be put to the abuse of writing grammatical analyses, and, in general, to the abuse of all written exercises which may, with more advantage, be replaced by oral exercises, illustrations on the blackboard, interrogations, explanations of reading lessons and comments on the same. In the logical analysis the teacher must endeavor to distinguish above all the subject, the verb, and the attribute, and to point out the principal and subordinate clauses.

(5) During the first three school years the French language must be studied in connection with the other elementary branches of the programme. The various oral and written French exercises will greatly facilitate the study of Latin in the sixth class (first year in Latin).

(6) The Latin grammar for the lower classes must also be very simple. It is no longer to be a collection of rules indicating how to translate French into Latin. The grammar should, as much as possible, give the reason for each rule. In Latin, and later in Greek, just as previously in French, the rules must be derived from the classical text instead of reading this text after the whole supply of abstract rules has been exhausted. The principal object is to learn to translate from Latin into French; the translation from French into Latin is to be regarded chiefly as a means of verification.

(7) Oral translations from the French into Latin, under the direction of the teacher and during the class, must, therefore, be connected with the written translation made by the pupil alone. In a measure, as the pupils advance in age they do not require so much assistance and must be accustomed to make personal efforts. The teacher may also read slowly a carefully prepared text to his pupils and require them to translate it into Latin as fast as he reads it.

(8) The true object of Latin composition and translation from French into Latin being to ascertain and increase results acquired, thorough explanation of the classical text shall henceforth occupy the largest space in literary studies. As soon, however, as the pupil is sufficiently familiar with Latin it is useful to make him sometimes express his ideas in that language. For the Latin narrations in the second class and the discourses in the class of rhetoric there shall, therefore, be shorter Latin compositions on various subjects and at briefer intervals. The French compositions in the different grades shall no longer consist exclusively of narrations, discourses, and letters. All subjects which tend to stimulate reflection, to form the taste, to strengthen the judgment, shall be used in the exercises of the class. In the rhetoric class the subjects for composition shall be especially of a literary character.

(9) Literal translations should be the exception and only made use of for a few passages.

(10) The use of too complete and detailed dictionaries should be considerably restricted; they prevent the pupil from making efforts himself, since they contain the solution of almost all the difficulties and even the translation of many passages. Small dictionaries ought to suffice. Good translations of the classical text may be tolerated.

(11) The practice of composing Latin verses shall henceforth be discontinued. More stress shall be laid on the study of French versification. The most talented pupils may, however, be allowed to write Latin verses.

(12) The study of history in the higher classes should tend more to develop knowledge of the institutions and customs of nations and concern itself a little less with their wars. The history of France should show, above all, the general development of French institutions from which our modern society has sprung, and it should inspire the pupil with respect and attachment for the principles upon which this society is founded.

(13) Written exercises are to be reduced in extent. Oral lessons and interrogations should occupy most of the time in all the classes.

(14) The council thinks that the majority of modifications to be introduced will require more direct participation on the part of the pupil and more frequent intervention on the part of the teacher during the lessons. The council, therefore, recommends a subdivision of the larger classes of the lycées.

(15) The council recommends that the lessons in history and in the sciences be given by special professors as soon as the administration shall have a sufficient number of teachers and adequate resources.

The following is the course of studies prepared for French lycées and communal colleges by the superior council of public instruction, and

made obligatory by M. Jules Ferry, minister of public instruction and fine arts, August 2, 1880:

COURSE OF STUDIES—ELEMENTARY DIVISION.

Preparatory class (for pupils 8 years old).

French language (10 hours): Reading, writing, recitation, explanation of each word and sentence; grammar, explanation of the most elementary rules; oral and written language lessons and spelling; formation of sentences; comments on reading lessons.

History (2 hours): Biographies of celebrated men of ancient and modern times; repetition by the pupils of short historical accounts given by the teacher.

Geography (2 hours): Elementary notions of natural geography. (The teacher will define, and make the pupils understand by means of descriptions and examples, the meaning of the principal terms of physical geography, and indicate on the globe and the map the situation of the continents and especially the position of Europe and France.) Elements of physical geography of France, especially of the commune and the department.

Sciences (4 hours): Whole numbers; mental arithmetic; object lessons.

Modern languages (German or English, 4 hours): Readers for beginners.

Drawing (2 hours): Elements of drawing.

Eighth class (for pupils 9 years old).

French language (10 hours): Reading, writing, recitation, explanation of each word and sentence; grammar, application of the rules; exercises of style and spelling; comments on reading lessons.

History (2 hours): Summary of the history of France to the accession of Henry IV; simple historical accounts by the teacher and repetition by the pupils.

Geography (2 hours): Elementary geography of the five parts of the world; principal voyages of discovery; celebrated navigators.

Sciences (4 hours): Arithmetic of whole numbers; mental arithmetic; elements of plane geometry; elements of the natural history of animals and plants.

Modern languages (German or English, 4 hours): Elements of grammar; reading and conversation; explanation and recitation of easy authors; formation of easy sentences. *German:* Selections of prose and poetry. *English:* Selections, Miss Edgeworth's select tales.

Drawing (2 hours).

Seventh class (pupils 10 years old).

French language (8 hours): Reading, writing, recitation, explanation of every word and sentence; grammar; language lessons and spelling; easy exercises in composition and written analysis of oral lessons in history.

History (2 hours): History of France from the accession of Henry IV to our times; historical accounts by the teacher and repetition by the class, either oral or in writing.

Geography (2 hours): Elementary geography of France.

Sciences (4 hours): Arithmetic of whole numbers and decimal numbers; the metric system; geometrical figures; solids, explained by means of relief models; elements of the natural history of the soil and stones; elements of experimental sciences.

Modern languages (4 hours): Elements of grammar; explanation and recitation of easy authors; reading and conversation; formation of sentences. *German:* Selections Krummacher's Parabeln. *English:* Selections; Day's Sandford and Merton; Miss Edgeworth's select tales.

Drawing (2 hours).

After the completion of the course in the seventh class the pupils are examined for a higher grade.

GRAMMAR DIVISION.

Sixth class (pupils 11 years old).

French language (3 hours): Grammar; reading, recitation, and explanation of French authors; selections, prose and poetry; La Fontaine's Fables; language lessons and spelling; easy compositions.

Latin (10 hours): Grammar; Latin prosody; recitation and explanation of easy Latin authors; De Viris Illustribus Romæ; translations into Latin, especially oral; translations from Latin into French. Much time must be devoted to the preparation and explanation of the Latin text.

History (2 hours): Ancient history of eastern nations; ancient geography.

Geography (1 hour): General geography of Europe and the Mediterranean basin.

Sciences (3 hours): Arithmetic; fractions; geometry; elementary instruction respecting the sphere; elements of physics and chemistry.

Modern languages (3 hours): Grammar; explanation and recitation of authors; reading and conversation; translations from the French into the foreign tongue, especially oral; translations from the foreign tongue into French, especially oral. *German authors:* Selections; Campe: Robinson der Jüngere; Herder and Liebeskind: Palmblätter; Musæus: Sammlung von Erzählungen. *English authors:* Miss Edgeworth's select tales; Aiken and Barbauld: Evenings at Home; Miss Corner: History of England.

Drawing (2 hours): Graphic drawing (beyond the 22 regular school hours).

Fifth class (pupils 12 years old).

French (3 hours): Reading, explanation, and recitation of French authors; selections, prose and poetry; Fénelon: Télémaque; Buffon: selections; Racine: Esther; Boileau: Épisodes du Lutrin, Satires; language lessons and spelling; easy compositions.

Latin (10 hours): Grammar; review of the elements, syntax completed; etymology; prosody; explanation and recitation of Latin authors; selections; Phædrus: select fables; Cornelius Nepos; translations from French into Latin, especially oral; translations from Latin into French; brief study of literary history, in connection with the explanation of texts.

History (2 hours): History of ancient Greece; ancient geography.

Geography (1 hour): Geography of Africa, Asia, America, and Australia.

Sciences (4 hours): Practical arithmetic; elements of commercial arithmetic; geometry, measurement of surfaces and of simple volumes; zoölogy.

Modern languages (3 hours): Grammar continued; explanation and recitation of authors; reading and conversation; translations from French into foreign tongues and from foreign tongues into French. *German authors:* Selections; Niebuhr: Helden-geschichte Griechenlands; Grimm: Volkserzählungen; Andersen: Kindermährchen. *English authors:* Selections; Walter Scott: Tales of a Grandfather; Hughes: Tom Brown's School Days at Rugby; Captain Cook's travels; Miss Corner: History of Greece.

Drawing (2 hours beyond the 22 regular school hours).

Fourth class (pupils 13 years old).

French (3 hours): Reading: explanation of French authors; elements of French etymology; laws governing the formation of French words; words of popular and words of learned origin; selections, prose and poetry; Mme. de Sévigné: Lettres choisies; Voltaire: Charles XII; Racine: Athalie; Boileau; language lessons and spelling; brief study of literary history, in connection with the reading of authors; French composition.

Latin (6 hours): Review of grammar; continuation of exercises on the vocabulary; elements of prosody; explanation and recitation of Latin authors; Cæsar: De Bello Gallico; Quintus Curtius; Virgil: Æneid (books I and II); Ovid: Metamorphoses;

oral and written translations from French into Latin; translations from Latin into French; elements of literary history in connection with the reading of authors.

Greek (6 hours): Grammar: first elements; easy authors; selections; translations from French into Greek.

History (2 hours): Roman history.

Geography (1 hour): Geography of France.

Sciences (6 hours): Arithmetic, elements; plane geometry: first elements; geology and botany.

Modern languages (2 hours): *German authors*: Selections; Lessing's Fabeln; *Benedix*: Fausttheater; Kotzebue: Die kleine deutsche Stadt, Bauer und Städter; *Les-sing*: Minna von Barnhelm. *English authors*: Selections; Daniel Defoe's Robinson Crusoe; Irving: Travels of Christopher Columbus; Pope: Windsor Forest; Miss Corner: History of Rome.

Drawing (2 hours beyond the 22 regular school hours).

After the completion of the course in the fourth class an examination for a higher grade takes place.

HIGHER DIVISION.

Third class (pupils 14 years old).

French (3 hours): Study of the French language; laws governing the formation of French words; French prosody; reading, explanation, and recitation of French authors; selections of French prose and poetry of the sixteenth, seventeenth, eighteenth, and nineteenth centuries; Bossuet: Discours sur l'histoire universelle (part III); Montesquieu: Grandeur et décadence des Romains; Corneille: Horace, Cinna; Racine: Andromaque, Les Plaideurs; French exercises and compositions; analysis of French authors; elements of French bibliography.

Latin (5 hours): Review of the grammar; Latin prosody; metrical exercises; explanation and recitation of Latin authors; Cicero: Pro Archia Poeta, De Suppliciis, De Senectute; Sallust; Livy, books XXI and XXII; Virgil: Eclogues, Georgics, Aeneid (books III, IV, and V); translations from French into Latin and from Latin into French; elements of Latin bibliography; analysis of authors.

Greek (5 hours): Grammar continued; recitation of Greek authors; etymology; Lucian: Dialogues of the dead; Herodotus: Selections; Xenophon: Anabasis; translations from the Greek into French; elements of Greek bibliography.

History (3 hours): History of Europe, and especially of France, from 395 to 1270.

Geography (1 hour): Physical, political, and economical geography of Europe, exclusive of France.

Sciences (3 hours): Arithmetic and plane geometry; elements of algebra; physics: weight, equilibrium of liquids, heat.

Modern languages (3 hours): Grammar: Review of syntax; formation of words; elements of prosody; explanation and recitation of authors; reading and conversation; translations; brief bibliography. *German authors*: Selections; Goethe: Französischer Feldzug; Chamisso: Peter Schlemihl; Auerbach: Schwarzwälder Dorfgeschichten; Schiller: Wilhelm Tell, Maria Stuart. *English authors*: Selections; Macaulay: History of England, first volume; Walter Scott: A novel; Shakespeare: Julius Caesar; Dickens: History of England.

Drawing (2 hours).

Second class (pupils 15 years old).

French (4 hours): Study of the French language; laws governing the formation of French words; explanation and recitation of French authors; selections, prose and poetry, of the sixteenth, seventeenth, eighteenth, and nineteenth centuries; Chanson de Roland; Joinville; Montaigne: Extracts; Corneille: Le Cid, Nicomède; La Bruyère; Racine: Iphigénie; Bossuet: Oraisons funèbres; Molière: L'Avare, Les Femmes Savantes; La Fontaine's Fables (the first six books); exercises and com-

positions; analysis of French authors; brief history of French literature till the death of Henry IV.

Latin (4 hours): Explanation and recitation of Latin authors; prosody and metrical exercises; Livy, books XXIII, XXIV, XXV; Cicero: In Catilinam, Somnium Scipionis; Tacitus: Agricola, Annales (books I, II, and III); Virgil: Æneid (books VI, VII, and VIII); Horace: Odes; translations, elements of Latin bibliography.

Greek (5 hours): Review of the grammar; recitation of Greek authors; exercises on the Greek vocabulary continued; Homer: Odyssey (books I, II, VI, XI and XII); Xenophon: Economics, Cyropædia; Herodotus: Selections; Plutarch's lives: Alexander, Demosthenes, Cicero; Euripides: Iphigenia, Hecuba, Alcestes; Greek translations; elements of Greek bibliography.

History (3 hours): History of Europe, and especially of France, from 1270 to 1610.

Geography (1 hour): Physical, political, and economical geography of Africa, Asia, America, and Australia; general means of communication on land and water; indication of the great centres of production and commerce.

Sciences (3 hours): Algebra; geometry; physics: optics, acoustics.

Modern languages (3 hours): Review of the grammar; explanation and recitation of authors; reading and conversation; written and oral translations; compositions; elements of literary history. *German authors:* Selections; Goethe: Gütz von Berlichingen, Reise nach Italien, Hermann und Dorothea; Schiller: Wallenstein, lyrische Poesie, Abfall der Niederlande; Hauff: Lichtenstein. *English authors:* Selections; Dickens: David Copperfield; Irving: Sketch Book; Goldsmith: The Deserted Village, The Traveller; Shakespeare: Macbeth; Walter Scott: A novel.

Drawing (2 hours in addition to the 22 hours prescribed).

Class of rhetoric (pupils 16 years old).

French (5 hours): Study of the French language; compositions; explanation and recitation of authors; selections of prose and poetry of the eighteenth and nineteenth centuries; Pascal: Pensées, Provinciales (I, IV, and XIII); Bossuet: Select sermons; La Bruyère; Fénelon: Lettres à l'académie; Buffon: Discours sur le style; Voltaire: Siècle de Louis XIV, select letters; Corneille: Théâtre; Racine: Théâtre; Molière: Le Misanthrope, Tartuffe; Boileau: Art poétique; La Fontaine's Fables (the last six books); discourses or French compositions; literary analysis of French authors; history of French literature since the accession of Louis XIII.

Latin (4 hours): Explanation and recitation of Latin authors; Cicero: Pro Milone, second Philippic, select letters; Livy: (books XXVI to XXX); Tacitus: Annales (books XIV and XV); Pliny: Select letters; Plautus: Extracts; Terence: Adelphi; Lucretius: Extracts; Virgil: Æneid (books IX to XII); Horace: Epistles; translations from Latin into French; Latin composition; literary analysis of Latin authors; elements of Latin bibliography.

Greek (4 hours): Explanation and recitation of Greek authors; Thucydides: Extracts; Demosthenes: Philippics, Discourse on the Crown; Plato: Crito, Apology; Homer: Iliad (books I, II, XVIII, and XXII); Æschylus: Extracts; Sophocles: Edipus, Antigone; Xenophon: Memorabilia; Aristophanes: Extracts; translations from Greek into French; elements of Greek bibliography.

History and geography (4 hours): History of Europe and especially of France from 1610 to 1789; physical, political, administrative, and economical geography of France and her colonial possessions.

Sciences (3 hours): Geometry; cosmography; physics: magnetism, electricity.

Modern languages (3 hours): Composition; explanation and recitation of authors; reading and conversation; written and oral translations from the French into foreign languages; translations from foreign languages into French; elements of literary history in connection with reading. *German authors:* Selections; Lessing: Hamburgische Dramaturgie; Goethe: Tasso, Iphigenie, lyrische Poesie; Schiller: Die Braut von Messina, Der dreissigjährige Krieg. *English authors:* Selections; Dickens: Nicholas

Nickleby; Walter Scott: *The Scotch Puritans*; Shakespeare: Henry VIII, Richard III, Othello; Byron: *Childe Harold*.

Drawing (2 hours).

Class of philosophy (8 hours a week).

Course of philosophy: psychology, logic, morals, history of philosophy; elementary notions of political economy; French dissertations. *French authors*: Descartes: *Discours sur la méthode*, *Première méditation*; Leibnitz: *Monadologie*. (*One hour*): Explanation of Latin and Greek authors. *Latin authors*: Cicero: *De Legibus* (book I); Seneca: *De Vita Beata*. *Greek authors*: Plato: *Republic* (book VIII); Aristotle: *Ethics*.

History (3 hours): History of France and contemporary history from 1789 to the adoption of the present constitution in 1875.

Sciences (9 hours): Review of the mathematical, physical, and natural sciences; elements of mechanics; chemistry; anatomy and physiology of animals and plants.

Modern languages (1 hour): *German authors*: Selections of a philosophical character; Goethe: *Faust* (Part I); Lessing: *Laocoön*; correspondence between Schiller and Goethe, extracts; Herder: *Ideas concerning the Philosophy of the History of Humanity*; Schiller: *Esthetic works*. *English authors*: Selections of a philosophical character; Bacon: *Essays*; Pope: *Essay on Criticism*; Macaulay: *History of England*; John Stuart Mill: *Liberty*.

Drawing (2 hours).

SECONDARY SCHOOLS FOR GIRLS.

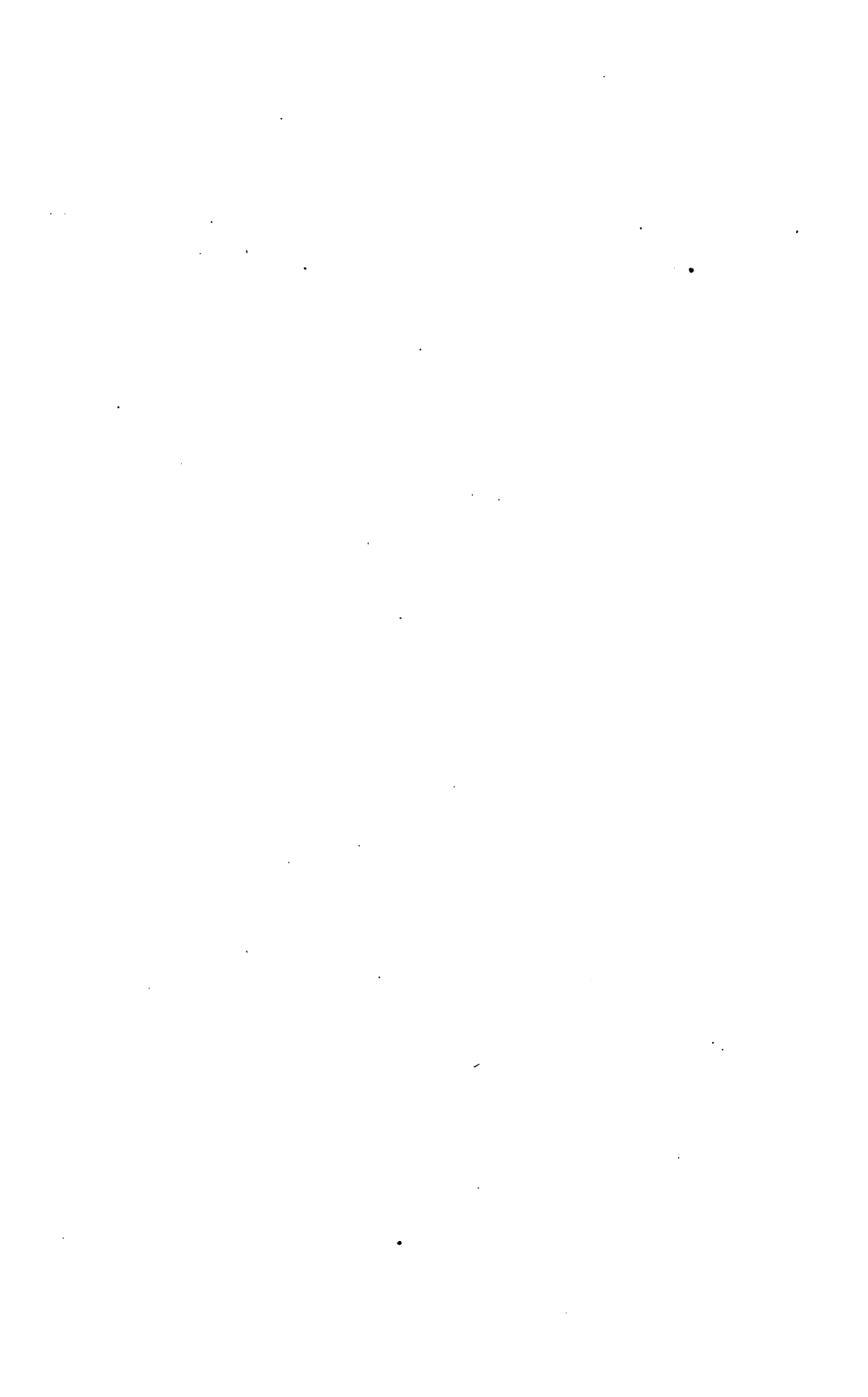
The bill to establish public secondary schools for girls became a law in November, 1880. The state will establish and support schools at Paris, Bordeaux, Dijon, Grenoble, Rheims, Lille, Lyons, Marseilles, Nancy, Nantes, and Rouen. The departments and communes will be aided by the state if they establish secondary schools for girls in other places. The subjects of instruction are obligatory and optional. The obligatory branches are: The French language, history of the French language and literature, philosophy, national history; a synopsis of general history, geography, arithmetic; the elements of physical and natural sciences; hygiene and elements of nursing, domestic economy; German, English, Italian, or Spanish common law, and needle-work. The optional branches will be determined for each school by its director, with the approval of the minister of public instruction.

A course of pedagogy is to be attached to each school for such pupils as desire to prepare themselves for the school service.

The teaching staff consists of male and female teachers, but whenever a lesson is given by a male teacher the presence of a female teacher is obligatory.

The new secondary schools are to be boarding and day schools.

An amendment, offered in the Senate, to make religious instruction a regular branch of instruction in these schools was rejected by a vote of 142 to 126.



SUPERIOR INSTRUCTION.

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SUPERIOR INSTRUCTION.

The following is an abstract of the report on superior instruction made by M. Bardoux, minister of public instruction, worship, and the fine arts, to the President of the French Republic.¹

ORIGIN OF SUPERIOR INSTRUCTION.

During the Roman domination the principal cities of Gaul had an officially organized educational system; but after the invasion of the barbarians the traces of it disappeared, and the churches with the monastic orders were the only places where some vestiges of the ancient culture are to be found.

Charlemagne made great efforts to revive education, and under the name of the Palatine School founded an establishment of which Alcuin was the first director and which has by some been considered the germ of the University of Paris.

It does not, however, appear that Charlemagne intended to concentrate in the Palatine School all the elements of restoration which were at his disposal. On his return from Rome, in 786, he addressed a circular to the bishops and abbots requesting them to promote the establishment of schools; he urges them to join their efforts with his for the revival of letters in his states. "It is necessary," he says, "to select as teachers men who are both able and willing to learn and also desirous of instructing others. It is our wish that, like true soldiers of the church, you should be pious, learned, and chaste, that is, leading good lives; you should also be wise, that is eloquent. Fail not to send a copy of this letter to all your suffragans and to all the monasteries." (Pertz, *Monumenta Germaniæ Historica*, t. III.) Other decrees followed this, and the clergy, responding to Charlemagne's appeal, established schools by the side of their churches, abbeys, and even small country presbyteries.

We read the following in a pastoral letter of Theodulphus, bishop of Orleans: "The priests shall open schools in town and rural districts, and if any one of the faithful wishes to intrust to them his children for instruction they shall not refuse to receive and teach them, but, on the contrary, they shall instruct them with perfect charity, requiring no pay except what parents may offer them voluntarily and through

¹ *Statistique de l'enseignement supérieur: enseignement, examens, grades, recettes et dépenses, en 1876; actes administratifs jusqu'en août 1878.* Paris, 1878.

affection." M. Guizot (*Histoire de la civilisation en France*, 23^e leçon) makes on this passage the following remark: "Here the faithful in general, the entire people, are meant, not only the people in the towns, but also the people in the country, who were the most neglected in regard to education." Louis le Débonnaire, Charles le Chauve especially, and Carloman continued the work commenced by Charlemagne; afterwards science and letters were again left to themselves, and were only represented by a few teachers at Rheims, Compiègne, Laon, and elsewhere.

In the twelfth century, however, René d'Auxerre teaches at Paris, Gillaume de Champaux and his disciple, Abailard, succeed him; afterwards, with many others, we find Pierre Lombard, bishop of Paris, the author of the *Sententiarum Libri IV*, the authority of which later was superseded by the *Decretum* of Gratian. The schools of the cloisters of Notre Dame, of Sainte-Geneviève, and of Saint-Victor formed from that time as many independent and rival centres of education, which were only united into one corporation towards the second half of the twelfth century, and styled by Mathieu Paris the *Consortium electorum magistrorum*.

The first privileges of this association are laid down in the diploma of Philippe Auguste of the year 1200, in which the scholastic and political prerogatives of the rector are defined. It was, however, only in the year 1215 that Robert de Courçon, cardinal of Saint-Étienne, legate of the Holy See, gave his first statutes to the *Consortium electorum magistrorum*, which was henceforth divided into faculties and took the name of University of Studies or simply University. It is indeed remarkable that the division of pupils into provinces or nations preceded the creation of the faculties.

The University was reformed in the thirteenth and fourteenth centuries by Innocent III and Urban V, apparently without the interference of the royal authority, and, in case of difficulties, it was the Holy See which solved them by virtue of its own authority, continuing to make use of a patronage of which we find the first indication in 1132 at the time of the quarrel between Professor Galon and the bishop of Paris. But at the Renaissance, and even before this period, royalty reclaimed its rights; thus, in 1489, we see the president of the Paris parliament, Pierre Boschet, directed, in the name of the King, to reform the University of Orleans; the letters of April 28, 1412, declared the parliamentary court alone competent to investigate the affairs of the University; in 1452, Charles VII appointed a commission which was to assist Cardinal d'Estouteville, legate of Pope Nicholas V, in the third reform of the University; finally, in 1595, Henry IV ordered a new revision of the University statutes, which were registered by the Parliament September 3, 1598, and published in the general assembly of the University September 18, 1600. Crevier, after having given the names of the royal commissioners, adds: "It will be seen that in this case the authority of the King acts alone, without the concurrence of the Pope. This is a remarkable

circumstance, and one which should not be overlooked. The first reforms had been made either by the Popes themselves or by their legates, without the interference of the secular power. In the reform of 1452, Charles VII joined his commissioners to the papal legate, but the latter presided; it is he who speaks in the statutes and who decrees as legislator, with the advice of the commissioners, whose powers did not extend beyond the privileges emanating from the royal authority. From this time the mode of thinking changed: secular power regained its rights, and the kings finally understood that it was their privilege to give laws to an institution established in their capital for the education of their subjects. Since the reform by Cardinal d'Estouteville, we no longer see the University applying to the Pope for regulations. It always applies to the royal authority, and more recently, in 1575 and 1577, the Parliament passed two decrees respecting its management."

But if the documents to which we have referred authorize us to say that from the sixteenth century royalty took under its tutelage both the studies and the discipline of the universities, there is nothing that indicates the action of a special agent having definite power from the sovereign to control the conduct of these establishments. Indeed, the legates and the parliaments are the instruments appointed by the two associated authorities; afterwards the parliaments became decidedly the organs of commanding royalty.

The intervention of the Holy See in university affairs was, however, not always considered superfluous, for the University of Dijon was founded in 1722 by letters patent of Louis XV and a bull of Innocent XIII.

There were in France 23 universities before 1789:

Paris: The University began apparently towards the end of the reign of Louis-le-Jeune, who died in 1180; its legal organization and its first statutes are anterior to 1200, the reign of Philippe-Auguste. The University of Paris included the following faculties in 1789: Theology, 8 professors, viz, four of the house of Navarre and 3 of the house of Sorbonne, and, besides, a professor of Hebrew; law, 7 professors, 1 of whom was for French law, and of agrégés; medicine, 6 professors (pathology, physiology, surgery, materia medica, chemical and galenical pharmacy, surgery explained in the French language), with instruction in chemistry and obstetrics for midwives. The faculty of arts was composed of 2 professors of each of the following ten colleges, founded in the years mentioned: Collège d'Harcourt, 1280; Collège du Cardinal-Lemoine, 1302; Collège de Navarre, 1304; Collège de Montaigu, 1314; Collège du Plessis-les-Tours, 1322; Collège de Lisieux, 1336; Collège de la Marche, 1402; Collège de Louis-le-Grand, 1560, under the name of Collège de Clermont; Collège des Grassins, 1569; Collège Mazarin, 1661.

There were, besides, 30 colleges for bursars of all kinds, which were abolished in 1769, and almost all united to the Collège Louis-le-Grand.

by letters patent of June 25 of the same year. The number of bursars in all the colleges was 541.

Aix: Founded in 1413 by Louis II, Count of Provence, confirmed by Pope Alexander V, and reorganized by letters patent of King Henry IV in October, 1603. It included the following faculties: Theology, 2 professors; law, 5 professors; medicine, 4 professors.

Angers: Founded in 1398 by Louis II, Duke of Anjou. It included the following faculties: Theology, 2 professors; law, 8 professors, later reduced to 4, 1 of whom was for French law; medicine, all the physicians established at Angers; arts, the professors of the college.

Besançon: Established at Gray by Otho, Count of Burgundy, towards the year 1280, transferred to Dôle by Philippe-le-Bon, Duke of Burgundy, in 1400, and definitely established at Besançon by the Emperor Ferdinand in 1564 and by Louis XIV in 1690. It included in 1789 faculties of theology, 2 professors; law, 4 professors; and medicine, 3 professors. There was, besides, at Besançon a school of surgery, founded by letters patent of 1773, and which was composed of 6 demonstrators.

Bordeaux: Founded in 1441 by Pope Eugene IV, at the request of officers of the municipality, who were made its patrons, and confirmed by Louis XI in 1473. It included faculties of theology, 6 professors, viz, 1 royal professor and 5 conventuals; law, 5 professors, 1 of them for French law; medicine, 2 professors; and arts, 2 professors.

Bourges: Founded in 1461 by Louis XI and his brother, the Duke of Berry. It included the following faculties: Theology, 2 professors; law, 5 professors; medicine, 4 professors; and arts. In 1754 the Chancellor de Lamoignon wrote to the professors: "Gentlemen: Complaints have reached me that your university grants diplomas of master of arts to candidates who have not passed any examination and who are sometimes unable to produce any certificate of studies pursued at a university. It was on the ground of similar abuses that the King determined, some years ago, to suppress the University of Cahors, and it would grieve me very much if the University of Bourges should meet the same fate."

Cahors: Founded by Pope John XXII, suppressed by Louis XV.

Caen: Founded by Henry VI, King of England, in January, 1431; confirmed by the Popes Eugene IV, Nicholas V, Calixtus III, Pius II, and Innocent VIII; reorganized in 1450 by Charles VII, King of France, at the request of the states of Normandy. It included faculties of theology, 3 professors; law, 5 professors and 8 assistants; medicine, 5 professors; and arts, 12 professors of the three colleges of the university. The professors charged with the teaching of mathematical and physical sciences, history, philosophy, and French and ancient literature must not be confounded with the so-called regents, who were only employed in the elementary classes.

Dijon: Founded by Louis XV in 1722 and by a bull of Pope Innocent XIII. It included a faculty of law, composed of 5 professors.

Douai: Founded by Philippe II, King of Spain, January 19, 1561; confirmed by Pope Pius V in 1569. It included faculties of theology, 5 professors; law, 5 professors; medicine, 3 professors; arts, 4 professors, 1 of them for the Hebrew language.

Montpellier: This university was composed of four faculties, which were founded at different periods. These were as follows: (1) Theology, instituted in 1421, by Pope Martin V, 2 professors, appointed after competition. (2) Law, the origin of which is traced as far back as the middle of the twelfth century, when, it is said, Placentius taught here Roman law; the popes granted the faculty very rare privileges; at the period of the Revolution it was composed of 5 professors. (3) Medicine, which formed a distinct body. In the bull of February, 1220, Pope Honorius III speaks of it as a university. In 1498 it was composed of four chairs, created by Louis XII; in 1592 Henry IV created a fifth chair for anatomy and botany; in 1597 a sixth chair was created for surgery and pharmacy; in 1680 a seventh chair, for chemistry; and, finally, in 1715, a chair for practical medicine. Besides the faculty of medicine, an edict of 1741 instituted a school of surgery, composed of 5 professors, acting as demonstrators, with as many assistants. (4) Arts, founded, it is thought, by Pope Nicholas IV, in 1289; it was composed of 2 professors.

Nancy: Founded in 1572, at Pont-à-Mousson, by Duke Charles III and the Cardinal of Lorraine; transferred to Nancy by letters patent of August 3, 1768. It included the following faculties: Theology, 2 professors; law, 4 professors; medicine, 4 professors;¹ arts, professors of the college, founded in 1610 by Porcellets, bishop of Toul.

Nantes: Founded by the Dukes of Brittany, John V and Francis I, and definitely established by Pope Pius II, in 1460, at the request of the Duke Francis II. It included faculties of theology, 3 professors; law (transferred to Rennes in 1735), 5 professors; medicine, all the medical professors of Nantes, 4 of whom were each time designated to lecture, and, besides, a school of surgery, with 5 demonstrators; arts, the professors of the college.

Orleans: Founded in 1305, by Pope Clement V, who, having himself studied under the direction of the professors of law of this city, authorized them to constitute themselves into a university. It was confirmed in 1312 by King Philippe-le-Bel, who restricted the papal privileges and placed its members under the jurisdiction of the provost. It included a faculty of law, composed of 5 professors. It possessed a library of from 4,000 to 5,000 volumes, which had been founded in 1566 by the celebrated German jurist Giphanius.

Pau: Founded in 1722 by Louis XV. It included a faculty of theology, 2 professors, and a faculty of civil and canon law, 4 professors.

¹ To this faculty was annexed a college of surgery, created by letters of the King of June, 1770, and confirmed in November, 1771; it had 5 chairs. There was, besides, a college of medicine, founded in 1752 by King Stanislas, and united to the faculty of medicine. Its large revenues enabled it to procure a fine library, a botanical garden, and a chemical laboratory.

Perpignan: Founded by Peter III, King of Aragon, in April, 1349, and confirmed, the same year, by Pope Clement VI, who authorized it to teach all the sciences, except theology; but Pope Nicholas V authorized it, by a bull of August, 1447, to include theology in the course of study, and granted it the same privileges enjoyed by the University of Toulouse. As, in consequence of the war of the Spanish succession, the university lost the large revenues from the states of Catalonia, Louis XV made good this loss by his munificent donations in 1759.

Poitiers: Founded by a bull of Clement VII, of May 29, 1431, at the request of King Charles VII, who confirmed this establishment the same year. According to the papal bull it was to be composed of four faculties and constituted like the University of Toulouse. Its faculties were theology, 2 professors; law, 4 chairs, one of them for civil law, founded in 1679; arts, 3 professors, who were the professors of the college; and medicine, discontinued before 1789 for want of means.

Rheims: Founded in 1547 by the Cardinal of Lorraine, by virtue of a bull of Pope Paul III and of letters patent of Henry II. It included faculties of theology, 2 professors; law, 4 professors; medicine, 3 professors; and arts, 8 professors.

Strasburg: Lutheran University, founded in 1538 by the municipal senate and confirmed by Louis XIV in 1681. It received its first privileges in 1566 from the Emperor Maximilian II. It included 4 faculties, composed of 20 professors, who conferred degrees on Lutherans and Catholics and who were invested with the title of canons of St. Thomas, because the revenues of this collegiate church had been added to those of the university. Strasburg had also a Catholic university, founded by Cardinal von Fürstenberg and confirmed by Louis XIV. It included a faculty of theology and a faculty of arts.

Toulouse: Founded in 1215 by Philippe-Auguste, endowed in 1228 with 4,000 silver marks by Raymond VII, Count of Toulouse, confirmed in 1233 by Pope Gregory IX. It included faculties of theology, 3 perpetual professors and 6 conventual professors; law, 6 professors, the most celebrated for this branch in France; medicine, 5 professors and a demonstrator of anatomy. There was, besides, a school of surgery, composed of 6 professors and several assistant demonstrators; arts, 16 professors.

Valence: Established first at Grenoble in 1339 by the Dauphin Humbert II, transferred to Valence by letters patent of Louis XI—then a dauphin—of July 26, 1452, confirmed by the bull of Pius II, in May, 1459, and by Charles VIII, December 3, 1490. It included four faculties.

Independently of the universities and their colleges, primary instruction was given in the numerous schools under the patronage of the bishops or supported by the communes. At the states general of Orleans a request was made by the third estate "that a prebend be set apart

in every cathedral or collegiate church for the support of a preceptor, whose duty it should be to instruct the young gratuitously and without a salary. The preceptor was to be elected by the combined votes of the canons, mayors, aldermen, and forty persons from the neighborhood." At the same period (1560) the nobility wanted to make education obligatory, securing the aid of parents by means of fines. The attempt was repeated at the states general of Blois (1576 and 1588).

THE RÉGIME FROM 1791 TO 1808.

The institution of a central administration of the faculties, colleges, and schools dates from the end of the last century. Article VII of the decree of April 27 and May 25, 1791, assigned to the minister of the interior the task of maintaining provisionally the laws relative to public instruction and education. Does it follow that the temporary power to execute the school laws given to the minister conferred upon that officer at the same time complete power over educational affairs? This may be doubted, for the decree of December 22, 1789, had intrusted to the departmental administrations, under the authority and inspection of the King, as supreme chief of the nation and the general administration, "the superintendence of public education and of political and moral instruction." It would seem, therefore, from the wording of this decree that the intention was to decentralize, and not to place in one hand the direction of schools of all kinds. The assembly had reserved the right to examine this question more thoroughly, and, as it did not know which system to adopt, it decided to make no immediate change (decree of September 26, 1791), but directed the committee on the constitution to bring in a bill in harmony with the new order of things.

The report Talleyrand made is a very instructive document on many points. The first object of this report is to make us acquainted with the condition of the different scholastic institutions existing in 1790. In this respect the report is not always accurate. The second part of the report contains a plan of national education and indicates the means of providing for the direction of educational affairs by the organization of a council whose duty it should be to regulate education in general. Differing from Mirabeau, who intrusts to the legislative body the annual election of members of this council, Talleyrand confers the right of appointment upon the King.

The Constituent Assembly separated without agreeing upon any plan. The succeeding assembly agreed upon the appointment of a special committee of public instruction, composed of twenty-four members, among whom were Lacépède, Gaudin, Prieur, Condorcet, Quatremère, Brissot, Guadet, Pastoret, Carnot. Condorcet, resuming the work of Talleyrand, proposed still more radical measures, but the legislative corps separated before the reform projects were definitely agreed upon. The Convention, which made itself master of all public affairs, divided them into twenty-one committees, among which we find the committee

of public instruction, instituted by decree of October 2, 1792. This committee was subdivided into thirteen sections, viz: (1) General organization of public instruction; commission to prepare for composition or examination such elementary works as the public schools required; (2) Moral education; organization and management of the different schools; the control over boarding schools; responsibility which may be exacted from those who keep boarding pupils; private schools and their relation to public institutions; (3) Physical education; (4) Education of women; (5) Education of orphans, the congenital blind, and deaf-mutes; (6) Industrial education; (7) Travellers, libraries, museums, collections, general correspondence; mode of instruction in different grades; mode of instruction in places where the French language is little used; (8) Examinations, prizes and rewards; revision of the laws relative to patents, and the bureau of commerce; (9) National festivals; (10) Appointment of persons to vacant situations; first organization of the national society and of all grades of instruction; (11) Salaries and pensions; bursaries attached to the establishments of the old régime; (12) Bibliography; general catalogue of all the libraries and of the religious and other suppressed institutions;¹ (13) Finances and revenues of public institutions of learning.²

By decree of the 13th germinal, year II (April 2, 1794), based on the report of Carnot, the provisional executive council and the six ministries were abolished and replaced by twelve commissions. One of these commissions was charged with the control of public instruction; it was composed of two members and an assistant, who acted as secretary and keeper of the archives of the commission. It was charged with the preservation of national monuments, public libraries, museums, cabinets of natural history, and valuable collections, with the superintendence of schools and the methods of instruction, with everything relating to inventions and scientific researches, with the fixing of weights and measures, with theatres and national festivals, with the arrangement of statistics of population and of political economy. The twelve commissions corresponded with the committee of public safety, to which they were

¹The object of this work was to show the literary wealth of the republic, to form valuable collections of books for each department, and to arrange for the sale of all such works as the commission charged with their examination should deem advisable. The National Almanac of the year II (1794-'95) announces that this work was already considerably advanced.

²This committee was composed of twenty-six members; the most prominent were David, Guyton Morveau, Fourcroy, Grégoire, and Lakanal. The ministry of the interior is the agent of this committee for all the affairs of public instruction, and the powers of the third division of this department are indicated as follows: Correspondence relating to public education and instruction; the sciences, arts, academies, theatres; national libraries; national museum; rewards bestowed on artists; commission of monuments; public buildings and monuments; operations relative to weights and measures; manufactures of Sèvres, Gobelins, &c.; the administration of the Tuileries, the Louvre and its dependencies, the national buildings outside of Paris and formerly *depending on the civil list*; the furniture store-room.

subordinate. The members of the commission and their assistants were appointed by the National Convention on the nomination of the committee of public safety. The salary of each of the commissioners was 12,000 francs and that of the assistants 8,000 francs. The commissioners of public instruction and their assistants were appointed on the 26th fructidor, year II (September 12, 1794).

Under this organization were passed all the laws respecting education, most of which, however, remained unexecuted. A commission of three members, subordinate to both the committee of public safety and the committee of public instruction, was a complication very different from the unity it had been sought to secure. We seek in vain in this system for what had been insisted upon two years before, namely "an authority free from political fluctuations, a guardian of educational traditions," in a word, a real council of public instruction.

In the year IV (1795-'96), the ministries were reëstablished, and the ministry of public instruction was again placed under the jurisdiction of the minister of the interior.¹

This condition of affairs lasted during the whole time of the Directory. A new era was inaugurated under the Consulate; a distinct ministry was not yet created, but a councillor of state was intrusted with educational affairs. This was not all: Bonaparte realized Richelieu's and Condorcet's project, and charged the Institute of France to submit every five years its views on the improvements which might be introduced into public instruction. (Decree of the 13th ventôse, year X, March 3, 1802.)

A little later the general law of the 11th floréal (April 30, 1802) became a decisive instrument of regeneration of our schools. This law provides, indeed, for the first time, for a complete organization of the teaching corps. The inspectors general of education, associated with the director, formed a permanent committee, to whom the law gave the power of presenting to the government the names of candidates for vacancies in the lycées and the special schools. By the law of the 22d ventôse, year XII (March 12, 1804), which created the schools of law, the number of inspectors general was increased from three to eight. Public instruction still remained under the ministry of the interior, but the role of special director continued to grow in importance.

UNIVERSITY OF 1808.

The law of May 10, 1806, approved by imperial decree of the 20th, brought about a thorough change in our school system.

Article I says: "There shall be formed under the name of Imperial University a body which shall have exclusive charge of public instruction in the whole empire."

Art. II. "The obligations assumed by the teaching force are civil, special, and temporary."

¹ In the year IX (1800-'01) there was in the ministry of the interior only one bureau for all the public school affairs.

of public instruction, instituted by decree of October 2, 1792. This committee was subdivided into thirteen sections, viz: (1) General organization of public instruction; commission to prepare for composition or examination such elementary works as the public schools required; (2) Moral education; organization and management of the different schools; the control over boarding schools; responsibility which may be exacted from those who keep boarding pupils; private schools and their relation to public institutions; (3) Physical education; (4) Education of women; (5) Education of orphans, the congenital blind, and deaf-mutes; (6) Industrial education; (7) Travellers, libraries, museums, collections, general correspondence; mode of instruction in different grades; mode of instruction in places where the French language is little used; (8) Examinations, prizes and rewards; revision of the laws relative to patents, and the bureau of commerce; (9) National festivals; (10) Appointment of persons to vacant situations; first organization of the national society and of all grades of instruction; (11) Salaries and pensions; bursaries attached to the establishments of the old régime; (12) Bibliography; general catalogue of all the libraries and of the religious and other suppressed institutions;¹ (13) Finances and revenues of public institutions of learning.²

By decree of the 13th germinal, year II (April 2, 1794), based on the report of Carnot, the provisional executive council and the six ministries were abolished and replaced by twelve commissions. One of these commissions was charged with the control of public instruction; it was composed of two members and an assistant, who acted as secretary and keeper of the archives of the commission. It was charged with the preservation of national monuments, public libraries, museums, cabinets of natural history, and valuable collections, with the superintendence of schools and the methods of instruction, with everything relating to inventions and scientific researches, with the fixing of weights and measures, with theatres and national festivals, with the arrangement of statistics of population and of political economy. The twelve commissions corresponded with the committee of public safety, to which they were

¹The object of this work was to show the literary wealth of the republic, to form valuable collections of books for each department, and to arrange for the sale of all such works as the commission charged with their examination should deem advisable. The National Almanac of the year II (1794-'95) announces that this work was already considerably advanced.

²This committee was composed of twenty-six members; the most prominent were David, Guyton Morveau, Fourcroy, Grégoire, and Lakanal. The ministry of the interior is the agent of this committee for all the affairs of public instruction, and the powers of the third division of this department are indicated as follows: Correspondence relating to public education and instruction; the sciences, arts, academies, theatres; national libraries; national museum; rewards bestowed on artists; commission of monuments; public buildings and monuments; operations relative to weights and measures; manufactures of Sevres, Gobelins, &c.; the administration of the Tuileries, the Louvre and its dependencies, the national buildings outside of Paris and formerly *depending on the civil list*; the furniture store-room.

subordinate. The members of the commission and their assistants were appointed by the National Convention on the nomination of the committee of public safety. The salary of each of the commissioners was 12,000 francs and that of the assistants 8,000 francs. The commissioners of public instruction and their assistants were appointed on the 26th fructidor, year II (September 12, 1794).

Under this organization were passed all the laws respecting education, most of which, however, remained unexecuted. A commission of three members, subordinate to both the committee of public safety and the committee of public instruction, was a complication very different from the unity it had been sought to secure. We seek in vain in this system for what had been insisted upon two years before, namely "an authority free from political fluctuations, a guardian of educational traditions," in a word, a real council of public instruction.

In the year IV (1795-'96), the ministries were reëstablished, and the ministry of public instruction was again placed under the jurisdiction of the minister of the interior.¹

This condition of affairs lasted during the whole time of the Directory. A new era was inaugurated under the Consulate; a distinct ministry was not yet created, but a councillor of state was intrusted with educational affairs. This was not all: Bonaparte realized Richelieu's and Condorcet's project, and charged the Institute of France to submit every five years its views on the improvements which might be introduced into public instruction. (Decree of the 13th ventôse, year X, March 3, 1802.)

A little later the general law of the 11th floréal (April 30, 1802) became a decisive instrument of regeneration of our schools. This law provides, indeed, for the first time, for a complete organization of the teaching corps. The inspectors general of education, associated with the director, formed a permanent committee, to whom the law gave the power of presenting to the government the names of candidates for vacancies in the lycées and the special schools. By the law of the 22d ventôse, year XII (March 12, 1804), which created the schools of law, the number of inspectors general was increased from three to eight. Public instruction still remained under the ministry of the interior, but the role of special director continued to grow in importance.

UNIVERSITY OF 1808.

The law of May 10, 1806, approved by imperial decree of the 20th, brought about a thorough change in our school system.

Article I says: "There shall be formed under the name of Imperial University a body which shall have exclusive charge of public instruction in the whole empire."

Art. II. "The obligations assumed by the teaching force are civil, special, and temporary."

¹ In the year IX (1800-'01) there was in the ministry of the interior only one bureau for all the public school affairs.

According to the decree of March 17, 1808, no school may be established outside of the university without the sanction of its chief. No one may teach unless he is a member of the university and a graduate of its faculties. The decree fixes the number of faculties at five: theology, law, medicine, sciences, and letters.

The hierarchy of the central administration is regulated as follows: The grand master of the university, the chancellor, the treasurer, the council of the university, composed of thirty members and divided into five sections.

The grand master makes all the appointments, confers all the distinctions, and makes all the promotions in the university. He exercises a part of the disciplinary jurisdiction, calls the meetings of the council and presides over them.¹

CHANGES FOLLOWING THE RESTORATION.

There was every reason to fear that the fall of the university might follow that of Napoleon. His work was soon denounced as an instrument of power (instrument de règne). Although the total abolition of the university was demanded, there were men who successfully defended it at the sacrifice of its author.

MM. Guizot and A. Rendu, whose sentiments were beyond suspicion, attached great value to the services of a body which had won the esteem of the country. We have been able to find in publications very little known at present some traces of their personal projects. M. Guizot expressed himself against absolute liberty, against the establishment of hostile schools which would divide the children as the parents are divided, for the creation of a staff of teachers belonging to the state and recruited by state normal schools, for a superior educational council, and against a single chief, minister, or grand master. M. Rendu presents a complete plan of reform. He maintains the university and its monopoly, the grand master, the council, and creates 21 academies.

A royal decree of February 17, 1815, indicated the intentions of the new régime:

"Having been informed of the condition of public instruction in our kingdom," says Louis XVIII, "we observe that it is based upon laws which were more intended to serve the political aims of the government which made them than to spread among our subjects the benefits of a moral education and a training in conformity with the wants of our time. * * *

"We have thoroughly examined the institutions which we intend to reform, and it seems to us that a single and absolute authority is incompatible with the paternal intentions and liberal spirit of our government."

In concluding, the King expresses his intention to submit to the Chambers as soon as possible the organic laws of public instruction, and he decrees that there shall be henceforth seventeen universities, that each university shall be composed of: first, a council presided over by

... at the Tuileries under the presidency of the Emperor.

the rector; second, faculties; third, royal colleges; fourth, communal colleges; that the instruction and discipline in all the universities shall be regulated and superintended by a royal council of public instruction.

The royal council was composed of a president and eleven councillors appointed by the King. The office of grand master was abolished, and his powers were conferred on the royal council. This decree was essentially decentralizing, but the events of March 20 were an obstacle to its execution.

The imperial university system was again in vigor during the hundred days; then, on the return of Louis XVIII, it was thought best "to suspend all important innovations in public instruction"; the organization of the academies was provisionally maintained; "the powers conferred on the grand master and on the council of the university, as well as on the chancellor and the treasurer, shall henceforth be exercised, under the authority of the minister of the interior, by a commission of five members, which shall take the title of commission of public instruction." (Decree of August '15, 1815.) This shows that the idea of decentralization was entirely abandoned.

The commission of public instruction exercised its functions until 1820. By decree of November 1, 1820, it received again the title of royal council of public instruction, and the number of its members was increased from five to seven. Shortly afterwards the president of the council exercised to a great extent the functions of grand master. (Decree of February 27, 1821.) Finally, the office of grand master was formally reestablished by decree of June 1, 1822.

FORMATION OF A MINISTRY OF PUBLIC INSTRUCTION.

On August 26, 1824, a still more important step was taken, a ministry of ecclesiastical affairs and public instruction was created. The decree of establishment intrusts to the minister the functions of grand master of the university, "with the exception of those relating to the faculties of Protestant theology, in regard to which the functions of grand master shall be exercised by a member of our royal council, and which shall be continued under our minister of the interior, as well as all affairs relative to non-Catholic religious sects." The minister was assisted by two directors, one for ecclesiastical affairs and one for public instruction. Thus, even after the creation of a special department, public instruction remained partly under the jurisdiction of the minister of the interior.

The inevitable consequences of the creation of a ministry of public instruction were to limit the powers of the royal council.

By decree of 1845 the council of the university was again reconstructed as it had been established by decree of March 17, 1808. From 1845 to 1850 the minister published every year, in conformity with the organic decree, the names of the ordinary councillors of the university. This restoration of the council of the university was of short duration.

Charter of 1830 had included among the bills to be discussed a bill of public instruction and the liberty of teaching. The principle of liberty found its application in the primary education law of 1833, but M. Montalembert and his friends vehemently insisted on its application to secondary and superior education also. In their writings and discourses they incessantly referred to the promise contained in the charter; they invoked the rights of parents; but the government in full accord with the Chambers refused to comply with their request. Nevertheless, de Salvandy thought proper in 1847 to submit a new law, and, being convinced of the necessity of offering to private establishments more ample guarantees than they had hitherto enjoyed, he inserted in his project the following:

ARTICLE 34. There shall be established in the ministry of public instruction a superior educational council, whose duty it shall be to treat general educational questions, matters relating to public and private schools in common, and affairs relating specially to private schools and teachers. The council shall be composed of the royal council of the university and of twelve private councillors appointed by the King.

ARTICLE 35. May be appointed private councillors: former royal ministers; council-lors of state; first presidents of the courts of cassation, the court of accounts, the royal courts, and the procurators general attached to these courts; the archbishops or bishops; presidents of consistories; members of the Institute; chiefs and former chiefs of institutions with a full course (institutions de plein exercice).

SUPERIOR EDUCATIONAL COUNCIL OF 1850.

The new constitution affirmed the principle of liberty of instruction, and the National Assembly adopted March 15, 1850, an organic law of public instruction, of which the following is an abstract:

ARTICLE 1. The superior council of public instruction is composed of the minister, president; four archbishops or bishops, elected by their colleagues; a minister of the reformed church, elected by the consistories; a minister of the Augsburg confession, elected by the consistories; a member of the Jewish consistory, elected by his colleagues; three councillors of state, elected by their colleagues; three councillors of the court of cassation, elected by their colleagues; three members of the Institute, elected at the general assembly of the Institute; eight members appointed by the President of the Republic from among the council of the university, the inspectors general, the rectors, and professors of the faculties (these eight members form a permanent section); three teachers engaged in private institutions, appointed by the President of the Republic on the recommendation of the minister of public instruction.

ART. 2. The members of the permanent section are appointed for life. They alone receive a salary.

ART. 3. The other members of the council are appointed for six years. They may be re-elected.

The council holds at least four sessions a year. The minister may suspend it if he deems it expedient.

THE SUPERIOR COUNCIL OF 1852.

The decree of March 9, 1852, modified the organization of the council by substituting for the mode of electing members direct and annual appointment by the chief of the state. The council was then composed of three members of the senate, three members of the council of state, five archbishops or bishops, three members of the non-Catholic denominations, three members of the court of cassation, five members of the institute, eight inspectors general, and two teachers of private schools. The ordinary sessions of the council were reduced from four to two a year. The superior council adopted, in 1853, the title of imperial council of public instruction. This is the only modification which it underwent during the whole period of the Second Empire.

THE SUPERIOR COUNCIL OF 1873.

In 1871, after the Franco-Prussian war, the council of public instruction became disorganized. The senate existed no longer; the council of state was not yet reconstructed; the principle of annual and direct appointments by the chief of the state, inaugurated in 1852, seemed to be incompatible with the new ideas then in vogue. Consequently, on the 20th April, 1871, a proposition was submitted to the national assembly by Messrs. Dupanloup, the Duke de Broglie, Wallon, Vitet, Waddington, Mortimer-Ternaux, Beulé, the Count Jaubert, Saint-Marc Girardin, Generals d'Aurelles de Paladines and Trochu, Admirals Montagnac and Jauréguiberry, de Lavergne, de Corcelles, the Count de Mérode, and others.

In bringing in the bill the Duke de Broglie defined its character thus: "In the opinion of the legislator of 1850 the council was to be the free and faithful representative of all the elements of society, equally interested in the training of the coming generations. It was not simply a gathering of administrators associated with the direction of some branch of the public service, as the war and navy departments or the administration of the roads and bridges; it was a family assembly, an assembly of the entire French family, called together to superintend the first steps in the life of its own children. The clergy, the ministers of the various denominations, the magistracy, the council of state, in a word, all the great bodies which are the organs of the moral life of a nation, had their place in this supreme council in proportion to their importance."

Upon this proposition the national assembly passed a law, March 19, 1873, of which the following is an abstract:

ARTICLE 1. The superior council instituted in the ministry of public instruction is composed as follows: The minister, president; three members of the council of state in ordinary service, elected by the council of state; a member of the ministry of war, appointed by the minister of war; a member of the ministry of the marine, appointed by the minister of the marine; four archbishops or bishops, elected by their colleagues;

delegate of the reformed church, elected by the consistories; a delegate of the Augsburg confession, elected by the consistories; a member of the Jewish central consistory, elected by his colleagues; five members of the Institute, elected in the general assembly of the Institute; a member of the College of France, elected by his colleagues; two members of the court of cassation, elected by their colleagues; a member of the faculty of law, elected by the professors of the faculty of law; a member of the faculty of medicine, elected by the professors of the faculty of medicine; a member of the faculty of letters, elected by the professors of the faculty of letters; a member of the faculty of sciences, elected by the professors of the faculty of sciences; a member of the academy of medicine, elected by his colleagues; a member of the superior council of arts and manufactures, elected by his colleagues; a member of the superior council of commerce, elected by his colleagues; a member of the superior council of agriculture, elected by his colleagues; seven members of public instruction, appointed with the advice of the ministers by the President of the Republic; four teachers of private schools, elected by the council.

ART. 2. The members of the council are elected for six years. They may be reelected indefinitely.

ART. 3. The council holds two sessions a year. Extra sessions may be called by the minister.

ART. 4. The superior council may be called upon to give its opinion on proposed legislation, on regulations and decrees relative to education, and, in general, on all questions which the minister may submit. The council presents to the minister of public instruction every year a report on the condition of education in general.

It will be observed that the law of 1873 gives the professional and industrial schools, as well as the army and navy, a representation in the council. The permanent section was not maintained in the new law; the minister of public instruction, M. Jules Simon, proposed to organize instead an advisory committee of public instruction composed of seven members.

It appears from the foregoing that the superior council of public instruction has been profoundly affected by the political events which have for nearly three-quarters of a century exercised their influence on all public affairs in France. At first the council was invested with the most extensive powers; it was almost sovereign master of an educational monopoly. Later, in 1824, it ceded a part of its powers to the responsible minister, and still later, after the disappearance of the monopoly, it was transformed into an elective assembly, in which the university maintained its distinct representation. Soon afterwards it was made dependent on the chief of the state and lost part of its jurisdiction. Finally, when the elective system was readopted, it regained its former authority.

Whatever the integrity of the men in power may have been, their decisions were necessarily affected by the changeability of the institutions under which they worked, and if they have made efforts at all times to protect the interests of education it is too manifest that these interests have not always been looked at from the same standpoint, and it must also be admitted that reforms have been more frequent than improvements.

ADVISORY COMMITTEE OF PUBLIC INSTRUCTION.

This committee is not a new institution. We find traces of it in the decrees of March 13 and September 21, 1804, which order the organization of a superior council of education, composed of the five inspectors general of schools of law. A decree of September 23, 1850, authorized the minister to call upon the inspectors general to take part in the deliberations of the permanent section, and the decree of October 28, 1852, decided that the inspectors general were to meet every fortnight, and to examine, together with the chiefs of divisions of the central administration, the affairs submitted by the minister. Finally a decree of September 28, 1869, conferred on these meetings the title of committee of inspectors general. The minister presided over their meetings.

The new advisory council was organized in pursuance of a promise made by the minister at the time when the law on the superior council of education was discussed in the National Assembly. "As soon as the present bill has passed," said M. Jules Simon, "I shall institute, by a ministerial decree, an advisory committee, whose powers shall be definitely fixed. The committee shall be composed of men who are thoroughly acquainted with the most difficult and the most delicate question in school affairs, the inspection of institutions of learning, and who have reached the highest place in education, the Institute. This committee must not be composed of inspectors general exclusively, but we must add at least one member of every faculty in Paris, the presidents of the boards of admission at the two sessions at which promotions are made, the director of the superior normal school, and the directors of the three sections in the ministry of public instruction. The minister shall not be obliged to make any titular appointments nor to make decisions concerning the rights of the personnel without hearing first the opinion of the committee. I do not know a minister who would not feel that by ignoring the advice of the committee he largely increases his responsibility." The bill was passed March 19, 1873, and on the 25th of the same month the decree above referred to was issued. The new committee was composed of the minister (president), twelve inspectors general designated by the minister, the vice rector of the Academy of Paris, the director of the superior normal school, a professor of each faculty in Paris (with the exception of the theological faculty), professors of the College of France, of the museum, of the superior school of pharmacy, the directors of superior, secondary, and primary instruction in the ministry, and the chief of the division of accounts in the central administration. The committee was divided into three sections, each section to meet once a month and the committee in general assembly once a trimester.

The committee was reorganized by decrees of December 5, 1877, and January 10, 1878.

DECREE OF DECEMBER 5, 1877.

ARTICLE 1. The advisory committee of public instruction is presided over by the minister. It is divided into three sections, corresponding to the three orders of instruction: superior, secondary, and primary. Each section elects its president and its secretary, and may subdivide itself into special commissions.

ART. 2. The section of superior education is composed of the inspectors general of superior education, the professors of the faculties and the superior schools of pharmacy, the professors of establishments of superior instruction, the vice rector of the Academy of Paris, and the director of the superior normal school. The delegates of the faculties to the superior council of public instruction are ex officio members of the section until their appointment expires.

The section of secondary education is composed of inspectors general of secondary education, the inspectors general of modern languages, the vice rector of the Academy of Paris, and the director of the superior normal school.

The section of primary education is composed of inspectors general of primary education, of the vice rector of the Academy of Paris, and the director of the primary normal school of the department of the Seine.

The directors of these orders of education in the ministry of public instruction are ex officio members of the committee.

ART. 3. All those who are not ex officio members of the committee will be appointed by the minister for five years.

ART. 4. The members of the Institute and the functionaries of public instruction who are called together every year by the minister for the general inspection or to preside over the examination jury may, by decree of the minister, sit in the council and vote.

ART. 5. Each section meets at the call of the minister at stated times.

ART. 6. The committee gives its advice on proposed legislation, regulations, and courses of study, and on administration and disciplinary questions which may be submitted by the minister.

ART. 7. At the end of each school year each section holds a special session to prepare a list of teachers recommended for promotion.

ART. 8. The dispositions contrary to this decree are abrogated.

DECREE OF JANUARY 10, 1878.

ARTICLE 1. The section of superior education of the advisory committee of public instruction is divided into five special commissions, viz: The commission on courses of study and discipline, the commission on law, the commission on medicine and pharmacy, the commission on sciences, and the commission on letters.

ART. 2. Each commission meets at the call of the minister.

CENTRAL ADMINISTRATION OF PUBLIC INSTRUCTION.

On January 1, 1878, the central administration of public instruction was organized as follows:

Cabinet of the minister; cabinet of the under secretary of state; interior service (service intérieur); bureau of rolls and archives. Direction of sciences and letters—first bureau: historical works and scientific societies, the Institute, missions, encouragements to scientific societies and to literary persons, library of the ministry; second bureau: libraries, subscriptions; third bureau: book depositary and school libraries. Direction of superior education—first bureau: general inspection, faculties and superior schools, private superior schools; second bureau: scientific and literary establishments, academic administration; third bureau: material and accounts. Direction of secondary education—first bureau: classical and special instruction, bursaries; second bureau: personnel; third bureau: material and accounts. Direction of primary education: first bureau: personnel; second bureau: disputed matters and discipline; third bureau: administration and material; fourth bureau: accounts. Divis-

ion of accounts—first bureau : accounts in general ; second bureau : pensions, accounts of the central administration.

Budgets of the central administration of public instruction in 1878 and 1868.

Nature of expenses.	No. of employés.	Amount of yearly salaries.	Appropriation in—		Differences in the budget of 1878.	
			1878.	1868.	Increase.	Decrease.
		<i>Francs.</i>	<i>Francs.</i>	<i>Francs.</i>	<i>Francs.</i>	<i>Francs.</i>
Salary of the minister.....		60,000	60,000	100,000		40,000
Salary of the under secretary of state.....		20,000	20,000		20,000	
Secretary general.....				18,000		18,000
Director of the personnel.....				15,000		15,000
Chief of the cabinet of the minister.....	1	7,000	7,000	6,000	1,000	
Under chief of the cabinet of the minister.....	1	4,000	4,000		4,000	
Chief of the cabinet of the under secretary of state.....	1	4,000	4,000		4,000	
Directors.....	4	13,000–15,000	58,000		58,000	
Chief of division.....	1	12,500	12,500	60,000		47,500
Under directors.....	3	8,000–9,200	26,400		26,400	
Bureau chiefs.....	13	6,500–9,200	102,900	72,600	30,300	
Assistant bureau chiefs.....	2	5,500–6,000	11,500		11,500	
Under bureau chiefs.....	16	4,500–6,000	81,300	63,300	18,000	
Assistant under bureau chiefs.....	2	3,600–4,000	7,800		7,800	
Employés of different classes.....	84	1,500–4,100	216,400	193,000	23,400	
Librarian.....	1	3,500	3,500		3,500	
Laborers.....	34	200–2,100	50,200	40,300	9,900	
Indemnities and aids.....			5,000	5,000		
Total.....	163		670,500	573,200	217,800	120,500
Increase in 1878.....					97,300	

Nature of expenses.	Appropriation in—		Differences in the budget of 1878.	
	1878.	1868.	Increase.	Decrease.
	<i>Francs.</i>	<i>Francs.</i>	<i>Francs.</i>	<i>Francs.</i>
Fuel.....	18,000	20,000		2,000
Lighting.....	9,000	10,000		1,000
Fitting up and care of bureaus.....	10,000	10,000		
Printing.....	20,000	20,000		
Keeping buildings and furniture in repair.....	35,000	45,000		10,000
Various unforeseen expenses, ceremonies, illuminations.....	34,900	30,000	4,900	
Cost of the material of the superior council of public instruction.....	5,000	5,000		
Total.....	131,900	140,000	4,900	13,000
Decrease in the budget of 1878.....			8,100	

MINISTERS OF PUBLIC INSTRUCTION SINCE 1808.

Following is a complete list of the ministers of public instruction, with their official titles, from March 17, 1808, to the present time:

1808-1815: (1) Count de Fontanes, grand master of the imperial university, March 17, 1808; (2) M. de Beausset, formerly bishop of Alais, president of the royal council of public instruction, February 17, 1815; (3) Count de Lacépède, grand master of the imperial university, March 30, 1815; (4) M. Lebrun, duke of Plaisance, grand master of the imperial university, May 9, 1815.

1815-1830: (1) M. Royer-Collard, president of the commission of public instruction, August 15, 1815; (2) Count Decazes, minister of the interior, president of the commission of public instruction, December 29, 1818; (3) Count Siméon, minister of the interior, president of the commission of public instruction, February 21, 1820; (4) M. Lainé, president of the royal council of public instruction, November 1, 1820; (5) M. de Corbière, president of the royal council of public instruction, December 21, 1820; (6) Baron Cuvier, president of the royal council of public instruction, ad interim, June 21, 1821; (7) Count de Frayssinous, bishop of Hermopolis, grand master of the royal university, June 1, 1822; (8) Count de Frayssinous, bishop of Hermopolis, minister of ecclesiastical affairs and of public instruction, August 26, 1824, to February 1, 1828; (9) M. de Vatimesnil, minister of public instruction and grand master of the university, February 1, 1828, to August 8, 1829; (10) Baron de Montbel, minister of ecclesiastical affairs and of public instruction, August 8, 1829, to November 18, 1829; (11) Count de Guernon-Ranville, November 18, 1829, to July 29, 1830.

1830-1848: (1) M. Bignon, temporary commissioner in the department of public instruction, August 3, 1830, to August 11, 1830; (2) the Duke de Broglie, minister of public instruction and worship, August 11, 1830, to November 2, 1830; (3) M. Mérilhou, November 2, 1830, to December 27, 1830; (4) M. Barthe, December 27, 1830, to March 23, 1831; (5) Count de Montalivet, March 23, 1831, to April 29, 1832; (6) M. Barthe, ad interim, April 29, 1832; (7) Baron Girod (de L'Ain), April 30, 1832, to October 11, 1832; (8) M. Guizot, minister of public instruction, October 11, 1832, to November 10, 1834; (9) M. Teste, ad interim, November 10, 1834; (10) M. Guizot, November 18, 1834, to February 22, 1836; (11) Count Pelet (de la Lozère), February 22, 1836, to September 6, 1836; (12) M. Guizot, September 6, 1836, to April 15, 1837; (13) M. de Salvandy, April 15, 1837, to March 31, 1839; (14) M. Parant, March 31, 1839, to May 12, 1839; (15) M. Villemain, May 12, 1839, to March 1, 1840; (16) M. Cousin, March 1, 1840, to October 29, 1840; (17) M. Villemain, October 29, 1840, to December 30, 1844; (18) M. Dumon, ad interim, December 30, 1844, to February 1, 1845; (19) Count de Salvandy, minister of public instruction and grand master of the university, February 1, 1845, to February 24, 1848.

1848-1870: (1) M. Carnot, minister of public instruction and worship, February 24, 1848, to July 5, 1848; (2) M. Vaulabelle, July 5, 1848, to October 13, 1848; (3) M. Freslon, October 13, 1848, to December 20, 1848; (4) M. de Falloux, December 20, 1848, to September 14, 1849; (5) M. Lanjuinais, ad interim, September 14, 1849, to October 31, 1849; (6) M. de Parien, October 31, 1849, to January 24, 1851; (7) M. Ch. Giraud, January 24, 1851, to April 10, 1851; (8) M. de Crouseilhès, April 10, 1851, to October 26, 1851; (9) M. Ch. Giraud, October 26, 1851, to December 2, 1851; (10) M. H. Fortoul, December 3, 1851, to July 1, 1856; (11) Count Vaillant, ad interim, July 1, 1856, to August 13, 1856; (12) M. Rouland, August 13, 1856, to June 23, 1863; (13) M. V. Duruy, minister of public instruction, June 23, 1863, to July 17, 1869; (14) M. Bourbeau, July 17, 1869, to January 2, 1870; (15) M. Segrès, January 2, 1870, to April 14, 1870; (16) M. Maurice Richard, ad interim, April 14, 1870, to May 13, 1870; (17) M. Mège, May 13, 1870, to August 9, 1870; (18) M. Brame, August 9, 1870, to September 4, 1870.

1870-1879: (1) M. Jules Simon, minister of public instruction, worship, and fine arts, September 4, 1870, to May 18, 1873; (2) M. Waddington, minister of public instruction and fine arts, May 18, 1873, to May 25, 1873; (3) M. Batbie, minister of public instruction

tion, worship, and fine arts, May 25, 1873, to November 26, 1873; (4) M. de Fourtou, minister of public instruction, worship, and fine arts, November 26, 1873, to May 22, 1874; (5) the Viscount Arthur de Cumont, minister of public instruction, worship, and fine arts, May 22, 1874, to March 10, 1875; (6) M. H. Wallon, minister of public instruction, worship, and fine arts, March 10, 1875, to March 9, 1876; (7) M. Waddington, minister of public instruction, worship, and fine arts, March 9, 1876, to May 17, 1877; (8) M. J. Brunet, minister of public instruction, worship, and fine arts, May 17, 1877, to November 23, 1877; (9) M. Faye, minister of public instruction, worship, and fine arts, November 23, 1877, to December 23, 1877; (10) M. A. Bardoux, minister of public instruction, worship, and fine arts, December 13, 1877, to February 4, 1879; (11) M. Jules Ferry, minister of public instruction and fine arts, February 4, 1879.¹

CHANGES AND IMPROVEMENTS MADE IN INSTITUTIONS FOR SUPERIOR INSTRUCTION SINCE 1868.

Faculties of theology.—The faculty of Protestant theology of Strasbourg was transferred to Paris in 1877.

Faculties of law.—A faculty of law was established at Bordeaux in 1871 and another at Lyons in 1875; a chair of Roman law was added at Douai in 1875, and in 1876 eight new chairs of civil and criminal law were established in various places. In 1876 and 1877 a chair of history of law was established at Bordeaux, three chairs of political economy at Bordeaux, Rennes, and Toulouse, and seven courses of political economy at Aix, Caen, Dijon, Douai, Grenoble, Nancy, Poitiers. A general competition (*concours général*) has been instituted for all the students of the faculties of law. Political economy has been made obligatory and now enters into the examination for the licentiate.

Faculties of medicine.—New faculties were created at Lyons in 1874, at Bordeaux in 1878, and at Lille in 1875. Lyons has 25 chairs, Bordeaux 22, and Lille 18.

Practical exercises have been made obligatory in the faculties by decree of June 20, 1878, and, at the same time, the conditions of admission have been modified; candidates for matriculation must be bachelors of letters and sciences.

All the faculties are now or will soon be provided with laboratories and the necessary apparatus.

New chairs have been created at Paris and Montpellier.

Faculties of sciences.—Eighteen new chairs were established from 1873 to 1877, viz: At Paris, a chair of organic chemistry; at Marseilles, a chair of zoölogy; at Bordeaux, a chair of astronomy and a chair of botany; at Caen, a chair of mechanics; at Clermont, a chair of mechanics and a chair of botany and zoölogy; at Grenoble, a chair of mechanics and a chair of botany; at Lille, a chair of botany and a chair of chemistry applied to agriculture and industry; at Lyons, a chair of astronomy and a chair of chemistry applied to industry; at Nancy, a chair of botany; at Poitiers, a chair of botany and zoölogy; at Rennes,

¹As this work is going through the press, the ministries of public instruction and worship have been reunited, and M. Paul Bert has been appointed to succeed M. Ferry.

a chair of botany; at Rouen, a chair of chemistry applied to industry, and a chair of differential and integral calculus.

Faculties of letters.—In the faculty of letters at Paris a chair of Greek poetry was created in 1878. Chairs of geography have been created in the faculties of Toulouse, Bordeaux, and Lyons, and chairs of archæology at Paris, Lyons, Toulouse, and Bordeaux.

Superior schools of pharmacy.—Although these great establishments are styled schools, they are really faculties. Here, too, practical exercises have been made obligatory and the courses of study extended to four years for first class pharmacutists and to three years for those of the second class.

Full course medical and pharmaceutical schools (écoles de plein exercice).—The preparatory schools of Nantes and Marseilles, which have adopted this title, had to comply with special conditions, the expenses of which were borne by the two cities. The number of chairs had to be increased, the buildings enlarged, the salaries of the professors raised, &c.

Preparatory schools of medicine and pharmacy.—All these schools have been completely reorganized by decree of August 10, 1877. They may not have less than 11 chairs. All the dispositions relative to examinations for degrees, &c., are applicable to these schools.

Table showing the condition of institutions for superior instruction in 1867 —

Number of institutions.	Faculties and schools.	Chairs.	Complementary courses.	Conferences.	Total.
5	Faculties of Catholic theology	29	.....	.....	29
2	Faculties of Protestant theology.....	13	.....	.....	13
11	Faculties of law	98	14	.....	112
3	Faculties of medicine	61	19	.....	80
16	Faculties of sciences	102	27	.....	129
16	Faculties of letters	86	.....	.....	86
3	Superior schools of pharmacy	19	.....	.....	19
22	Preparatory schools of medicine and of pharmacy ..	165	.....	.....	165
5	Schools preparatory to superior instruction in sciences and letters.	42	3	.....	45
83	Total	615	63	.....	678

Table showing the condition of institutions for superior instruction in 1878.

Number of institutions.	Faculties and schools.	Chairs.	Complementary courses.	Conferences.	Total.
5	Faculties of Catholic theology	29	2	.....	31
2	Faculties of Protestant theology	13	1	4	18
12	Faculties of law	124	59	.....	183
3	Faculties of medicine	65	} 20	4	157
3	Mixed faculties of medicine and pharmacy	68		.....	147
15	Faculties of sciences	124	5	18	147
15	Faculties of letters	96	13	19	128
3	Superior schools of pharmacy	19	5	2	26
2	Full course schools of medicine and of pharmacy	34	.....	.....	34
16	Preparatory schools of medicine and pharmacy	176	.....	.....	176
4	Schools preparatory to superior instruction in sciences and letters.	42	.....	.....	42
80	Total	790	105	47	942

Table showing the number of students on the rolls from 1867 to 1876.

Years.	Theology.		Law.	Medicine.	Sciences.	Letters.	Pharmacy.	Preparatory schools of medicine and of pharmacy.	Schools preparatory to superior instruction in sciences and letters.	Total.
	Catholic.	Protestant.								
1867..	117	140	20,459	7,630	408	19,213	1,887	4,371	74	54,299
1868..	196	218	19,992	8,094	473	18,746	2,166	4,627	45	54,557
1869..	100	195	20,881	8,883	461	19,403	2,133	4,857	22	56,935
1870..	87	146	17,552	7,046	331	16,435	1,840	4,679	21	48,137
1871..	143	140	17,656	9,235	184	16,887	1,976	7,250	6	53,477
1872..	49	80	21,726	8,136	290	20,149	2,092	7,862	12	60,396
1873..	71	88	20,516	8,949	351	18,804	2,269	7,607	12	58,767
1874..	60	104	19,264	9,599	426	17,651	2,225	7,326	1	56,656
1875..	94	84	19,223	10,166	483	17,747	2,394	6,854	.....	57,045
1876..	62	79	18,581	9,526	431	17,498	2,577	6,412	25	55,191

Table showing the number of students attending the Catholic faculties from 1875 to 1878.

Faculties.	Number of students in —		
	1875-'76.	1876-'77.	1877-'78.
Faculties of law :			
Angers	192	316	468
Lille	191	239	209
Lyons	244	448	424
Paris	504	761	1,041
Toulouse			208
Mixed faculty of medicine and pharmacy :			
Lille		21	359
Faculties of sciences :			
Angers			16
Lille		7	18
Lyons			8
Paris	6	32	28
Faculties of letters :			
Angers		24	16
Lille		33	48
Lyons			88
Paris	36	41	37

Table showing the number of degrees obtained in the various faculties from 1867 to 1876.

Years.	Theology.						Law.			
	Catholic.			Protestant.			Bachelors.	Licentiates.	Doctors.	Certificates of capacity.
	Bachelors.	Licentiates.	Doctors.	Bachelors.	Licentiates.	Doctors.				
1867	4	6	5	20	2		1,495	1,157	100	98
1868	8	5	3	61			1,350	1,218	132	104
1869	10	8	4	56	1		1,315	1,170	109	125
1870	9	4	4	31	1	2	1,070	918	108	90
1871	4	2	3	33	2		1,042	621	65	58
1872	3	2	5	20	1	1	1,535	1,350	131	104
1873	9	5	2	19	3		1,361	1,288	116	123
1874	7	5	1	25		1	1,267	1,298	151	111
1875	12	4	8	20	1		1,187	1,125	191	99
1876	7	3	4	8	1	2	1,207	1,042	189	104
Total...	73	44	39	302	12	6	12,829	11,187	1,292	1,016

Table showing the number of degrees obtained, &c.—Continued.

Years.	Medicine.				Sciences.			
	Doctors.	Health officers.	Midwives of the first order.	Midwives of the second order.	Bachelors of the first order.	Bachelors of the second order.	Licentiates.	Doctors.
67	444	6	134	66	1,563	461	103	13
68	494	12	167	67	1,725	553	109	12
69	509	11	188	51	1,831	629	122	17
70	411	14	149	36	1,701	605	110	13
71	308	4	146	13	1,361	537	51	4
72	603	14	154	6	1,776	744	84	14
73	583	22	172	42	1,905	706	107	8
74	585	23	162	53	2,061	673	120	13
75	590	21	191	47	2,111	686	187	11
76	604	17	147	46	2,128	674	120	18
Total	5,131	144	1,610	427	18,162	6,268	1,113	123

Years.	Letters.				Pharmacy.			
	Bachelors of the first order.	Bachelors of the second order.	Licentiates.	Doctors.	Pharmacutists of the first order.	Pharmacutists of the second order.	Herbalists of the first order.	Herbalists of the second order.
67	3,340	.....	101	5	70	24	83	.....
68	3,859	.....	124	11	102	44	95	.....
69	4,221	.....	123	8	109	80	136	.....
70	3,957	.....	128	9	101	59	111	.....
71	3,859	.....	89	4	85	35	84	.....
72	4,371	.....	154	9	114	56	124	.....
73	4,424	.....	140	14	130	87	156	.....
74	4,324	1	134	15	110	115	149	.....
75	3,099	1,234	149	12	100	89	103	.....
76	927	2,375	131	12	80	64	99	.....
Total	36,381	3,610	1,273	99	1,001	653	1,140	.....

Table showing the number of degrees obtained, &c.—Continued.

Years.	Preparatory schools of medicine and pharmacy.				Schools preparatory to superior instruction in sciences and letters: Certificates of capacity.	Total number of diplomas and certificates.
	Health officers.	Pharmacentists of the second class.	Midwives of the second class.	Herbalists of the second class.		
1867.....	70	172	281	25	3	9,860
1868.....	82	159	295	21	2	10,814
1869.....	69	212	261	18	1	11,394
1870.....	43	142	245	13	.....	10,084
1871.....	71	193	241	20	.....	8,935
1872.....	82	268	231	15	.....	11,971
1873.....	90	246	239	15	.....	12,012
1874.....	75	257	252	18	.....	12,006
1875.....	94	264	248	9	.....	11,892
1876.....	100	242	241	12	.....	10,604
Total.....	776	2,135	2,534	166	6	109,572

Budgets of the faculties and superior schools in 1878 and 1868.

Faculties and schools.	Budgets.		Increase in 1878.
	For 1878.	For 1868.	
	<i>Francs.</i>	<i>Francs.</i>	<i>Francs.</i>
Faculties of Catholic theology	166,400	114,235	52,165
Faculties of Protestant theology	79,600	51,565	28,035
Faculties of law	1,634,000	1,005,626	628,374
Faculties of medicine	1,821,500	834,500	987,000
Faculties of sciences	1,667,100	884,900	782,200
Faculties of letters	1,075,100	630,595	444,505
Superior schools of pharmacy	419,150	200,400	218,750
Expenses for all faculties in common	2,382,480	213,700	2,168,780
Total	9,245,330	3,935,521	5,309,809

A reduction of 80,000 francs made in the above budgets in 1878 and 40,000 in 1868 reduces the totals to 9,165,330 francs for 1878 and 3,895,521 francs for 1868.

THE SUPERIOR NORMAL SCHOOL.

This important institution was placed in 1871 under the direction of the late M. Ernest Bersot, whose character and ability eminently fitted him for the high position.¹ The school showed once again what can be

¹M. Bersot died in 1879 and was succeeded by M. Fustel de Coulanges, a prominent Institute of France and a professor at the Sorbonne.

accomplished by intelligent efforts combined with a sentiment of professional duty. The most perfect discipline reigns among the students, and the good results achieved in the examination for degrees are a proof of the indefatigable devotion of their professors. The library of the institution has been increased by 15,210 volumes. The course of study lasts four years and includes the Greek language and literature, the Latin language and literature, the French language and literature, English and German languages and literature, philosophy, history, geography, grammar, higher mathematics, physics, chemistry, mineralogy, zoölogy, botany, astronomy, mechanics, drawing, music, and practical exercises in the laboratory.

LIBRARY OF THE UNIVERSITY.

The faculties of law and medicine of Paris and the superior school of pharmacy have each their special collection. The library of the University provides especially for the wants of the faculties of theology, sciences, letters, history, and philology. The number of its volumes has been increased from 40,000 to 109,135.

PRACTICAL SCHOOLS OF SCIENCE.

The number of laboratories where students could be admitted was very limited ten years ago. In a large number of faculties they only existed in name, and the scientific instruction was almost exclusively confined to the so called great lectures, which were above all intended to interest the public, but which were manifestly insufficient to give the students that persistent curiosity which can only be aroused by the personal handling of the apparatus. The two decrees of July 31, 1868, affirm the necessity of completing the theoretical lectures by practical exercises, manipulations, and conferences, and the necessity of establishing constant relations between professors and students, so that they are no longer strangers to one another. The same decrees provide that besides the laboratories of demonstration, to which all the students must be admitted, there shall be established special laboratories of research, reserved to the preparation of original works by the professors and other savants.

Immediately after the promulgation of these decrees a large number of conferences and laboratories were instituted and since that time practical exercises have been multiplied in the schools. There have been established 2 conferences for mathematics, 19 laboratories for physics and chemistry, 31 laboratories for natural sciences, 25 conferences for history and philology. The budget of these schools was 300,000 francs in 1877.

THE FRENCH SCHOOL AT ATHENS.

The members of the school reside at Athens but a few months of the year. As soon as the weather allows it, they visit in various parts

of Greece and Asia Minor the historic fields of antiquity, the ruins of cities and temples which have disappeared. The new school building recently erected cost 200,700 francs. The personnel consisted of 6 members in 1877.

FRENCH SCHOOL OF ARCHÆOLOGY AT ROME.

The members of the school at Athens were formerly compelled to remain three months in Italy before going to Greece. This disposition, which enabled the young men who had just left the superior normal school to visit Rome, Florence, or Venice, offered in fact more inconvenience than advantage. It was impossible to accomplish much in so short a period. A decree of 1873, signed by Thiers, created a course of archæology at Rome and fixed the time for remaining in Italy by future members of the school at Athens at one year. In November, 1874, the course of archæology adopted the name of French School of Archæology. Since 1876 the school has been in the Palazzo Farnese; in 1877 an appropriation of 51,000 francs was allowed for its definite organization. The school of Rome includes at present two groups: first, the members of the school of Athens who pursue their researches in the libraries and museums of Italy, in order to be better prepared for their work in Greece; second, the members of the school of Rome, who study all the documents, inscriptions, engravings, statues, and manuscripts which may throw some new light on the history of languages, institutions, and customs of Italy. Both groups are under the director of the school of Rome, who corresponds with his colleague at Athens relative to the studies and researches of members belonging to the school of Athens.

THE COLLEGE OF FRANCE.

The foundation of this great establishment coincided with the extensive movement in the sixteenth century which placed the study of arts, sciences, and letters on a new basis. The University of Paris, which was still imbued with the old scholastic spirit and under the control of theologians, showed itself more than ever hostile to all novelties. It refused to teach Hebrew, Greek, and all other branches from which the partisans of the reform derived their spirit of criticism and their ideas of liberty. The University was, therefore, opposed to the College of France founded by François I, and used all means to hinder its development. After great efforts by the University, the royal college was placed under its jurisdiction, but it did not receive the power to abolish it entirely. The royal professors or lecturers continued to instruct gratuitously, but they had no authority to confer degrees. The number of chairs increased, however, to such an extent that law, medicine, anatomy, the sciences, and letters were represented in the college with a liberty which was unknown in the faculties. This liberty is still to-day the rule in the College of France, which has been entirely separated from the University since the beginning of the present century. From

1871 to 1878 seven new chairs were added, viz, history of economic doctrines, modern philosophy, Assyrian philology and archæology, languages and literatures of Southern Europe, general anatomy, Greek inscriptions and antiquities, esthetics. The salary of the professors has been raised from 7,500 francs to 10,000 francs.

MUSEUM OF NATURAL HISTORY.

Not one of the great scientific establishments in France offers to the student resources comparable to those offered by the Museum of Natural History. Great improvements have been achieved since 1871; the building has been entirely transformed, so that to-day every professor is able to offer to his numerous pupils and to French and foreign savants all the facilities for research and work which they may desire. A second chair of botany has been created. The salary of the professors has been raised from 7,500 francs to 10,000 francs. The library has been increased by 31,182 volumes.

SPECIAL SCHOOL OF MODERN ORIENTAL LANGUAGES.

The decree of 1838 approved by M. Salvandy limited this school to the primary object of its foundation, viz, to prepare candidates for the French embassies, legations, and agencies in the eastern countries. The true object of the school had been overlooked; the spoken languages were so much neglected that France was obliged to employ and trust foreigners in political and commercial affairs with eastern nations. The decree of 1838 was soon forgotten, as M. Salvandy left the ministry before he had accomplished his intended reform. The present management dates from 1869. The decree of November 8 of that year was prepared by M. Duruy, then minister of public instruction. The number of lessons has been increased from 2 to 3 a week. The library has been increased from 800 to 11,000 volumes within ten years, and the salary of professors from 5,000 francs to 7,500 francs.

ACADEMIC ADMINISTRATION.

The decree of March 17, 1808, issued in pursuance of the law of May 20, 1806, provided* that the University should be composed of as many academies as there were courts of appeal. But as two departments were under the control of a special inspector, who corresponded directly with the grand master, there were only 26 academies. Each academy had a rector, one or more academic inspectors, an academic secretary, and an academic council.

The rector was placed under the immediate orders of the grand master, by whom he was appointed for five years. He was charged with the administration of the faculties, lycées, and colleges. He had to visit these establishments as often as possible, to attend the examinations of the faculties, and to sign and award diplomas.

The academic inspectors were appointed by the grand master on the nomination of the rectors.

The academic secretary kept the proceedings of the academic council. He was also guardian of the archives and of the seal.

The academic council, over which the rector presided, was composed of ten members, annually designated by the grand master. They were selected from the officers and functionaries of the academy. The council met at least twice a month.

A royal decree of February 17, 1815, substituted for the 26 academies 17 universities, having each a rector and a council; but a new decree of August 18, of the same year, reëstablished the academies of 1808.

A decree of September 7, 1848, reduced the academies to 20. The same decree created the Academy of Algiers.

Article 7 of the law of March 15, 1850, decided that there should be established an academy in each department.

PRESENT CONDITION.

1. *Academic districts.*—Article 1 of the law of June 14, 1854, established in France 16 academic districts. The Academy of Algiers, created September 7, 1848, formed the seventeenth district; the eighteenth was created at Chambéry by decree of June 13, 1860; but in 1870 the number was reduced to 17 by the loss of Strasburg. The territory of Belfort, administered by a special inspector, has been combined with the academy of Besançon.

2. *Rectors.*—Since 1808 the powers of these functionaries have not been changed much, except in one essential point. The law of June 14, 1854, decides that the prefects of departments shall exercise in future, under the authority of the minister of public instruction and upon the report of the academic inspectors, the powers formerly exercised by the rectors by virtue of the law of March 15, 1850, and by decree of March 9, 1852. Since that time the prefects have appointed, transferred, and discharged the primary teachers. The rectors' duties consist only in the superintendence of the regulations and methods of instruction in public primary schools.

No one can be appointed rector who has not taken the degree of doctor.

The rectors are appointed and recalled by the President of the Republic on nomination of the minister. Their functions are incompatible with any other salaried position. The rectors correspond directly with the minister. As in 1808, they preside over the academic councils; they direct and superintend the personnel, pupils, and accounts of public secondary and superior institutions of learning; they superintend private secondary schools, and they call the meetings of the faculties for the preparation of programmes of study. In case of disorder they may suspend instruction. They may also suspend a teacher of superior education from the exercise of his functions.

The rectors are divided into three classes; those of the first class receive 18,000 francs a year, those of the second class 15,000 francs, and

those of the third class 13,000 francs. Each rector has a secretary and one or several clerks. Their travelling expenses are fixed at 15 francs a day and transportation.

At Paris, the minister of public instruction holds the title of rector of the academy, but the official duties are administered by a vice rector. A decree of September 17, 1873, retires rectors on a pension at the age of 70.

3. *Secretaries and clerks of the academy.*—The salary of the academic secretaries at Paris is 8,000 francs and of the clerks from 1,600 to 3,000 francs. In the departments, the secretaries receive from 2,500 francs to 4,000 francs and the clerks from 1,600 francs to 2,400 francs.

4. *Academic inspectors.*—There are as many academic inspectors as there are departments in the academic districts. Paris has, however, eight resident inspectors. The academic inspectors assist the rectors in all their official functions; they represent them in their absence; they visit the faculties, lycées, and colleges in their name; they are immediately subordinate to the chief of the academy. On the other hand, they are in the domain of primary education placed under the authority of the prefects, who appoint, transfer, promote, and recall teachers on the written reports of the inspectors. The inspectors are appointed and recalled by the minister. Their functions are incompatible with any other salaried position. Their salaries range from 4,500 francs to 8,000 francs. Their travelling expenses are fixed at 10 francs a day and transportation. They are retired on a pension at the age of 65.

5. *Primary inspectors.*—Article 24 of the decree of August 22, 1854, provides that there shall be a primary inspector for every arrondissement. This decree, however, was not entirely executed until January, 1868. Several arrondissements have later been divided, and 23 new inspectorships have been created, dating from January 1, 1878. There are at present 409 inspectors, viz, 15 at Paris and 394 in the departments. The salary of primary inspectors ranges from 2,800 to 3,600 francs.

6. *Academic councils.*—The law of June 14, 1854, article 3, says:

The academic council is composed of the rector (president), the district inspectors, the deans of the faculties, and of seven members appointed every three years by the minister of public instruction.

Article 4:

The academic council sees that methods of instruction prescribed by the minister of public instruction are observed in the primary, secondary, and superior schools of their districts.

The council gives its opinion on questions of administration, finance, and discipline in the communal colleges, the lycées, and the institutions for superior instruction.

7. *Departmental councils.*—According to the law of June 14, 1854, article 5, the departmental council of public instruction is composed of the prefect of the department (president), the academic inspector, the primary inspector (designated by the minister of public instruction), and

of several members appointed for three years by the minister of public instruction.

Algeria.—The legislation which regulates public instruction in France is also applicable to Algeria. This colony forms an academic district by itself. All public and private schools are under the authority of the French minister of public instruction, with the exception of some schools in the military territory, which are under the jurisdiction of the governor general.

Budget of the academic administration for 1878.

Nature of expenses.	Amount.	Total amount.
THE PERSONNEL.		
Salaries of the rectors:	<i>Francs.</i>	<i>Francs.</i>
1 vice rector (Paris).....	18,000	
3 rectors, at 18,000 francs.....	54,000	
7 rectors, at 15,000 francs.....	105,000	
6 rectors, at 13,000 francs.....	78,000	
		255,000
Salaries of academic inspectors:		
8 inspectors of the Seine, at 8,000 francs.....	64,000	
1 inspector at Versailles.....	7,500	
26 inspectors of the first class, at 7,000 francs.....	182,000	
31 inspectors of the second class, at 6,500 francs.....	201,500	
33 inspectors of the third class, at 6,000 francs.....	198,000	
Supplementary indemnities.....	31,500	
		644,500
Salaries of the academic secretaries:		
1 secretary (Paris).....	8,000	
5 secretaries of the first class, at 4,000 francs.....	20,000	
6 secretaries of the second class, at 3,500 francs.....	21,000	
5 secretaries of the third class, at 3,000 francs.....	15,000	
		64,000
Salaries of academic clerks:		
7 clerks at Paris, at 2,000 to 3,500 francs.....	19,000	
11 clerks in the departments of the first class, at 2,400 francs....	26,400	
17 clerks in the departments of the second class, at 2,000 francs.....	34,000	
		79,400
Salaries of inspecting agents of the academy:		
28 agents of the first class, at 2,000 francs.....	56,000	
23 agents of the second class, at 1,800 francs.....	50,400	
33 agents of the third class, at 1,600 francs.....	52,800	
		159,200
Wages of servants:		
Janitors and servants.....		20,900
Colonial pay of officials in Algeria:		
Rector, inspectors, secretary, &c.....		11,050
CONTINGENT.		
Office expenses of the rectors.....		32,938
Travelling expenses of the rectors.....		19,600
Travelling expenses of the inspectors.....		81,000
Total in 1878.....		1,407,588
Budget of 1868.....		1,216,000
Increase in 1878.....		191,588

PRESENT CONDITION OF THE FACULTIES.

* 1. *Faculties of Catholic theology.*—Appointments are made by decree on the nomination of the minister of public instruction and after designation of one candidate by the bishop or archbishop.

The salaries were fixed by decree of January 14, 1876, as follows: Professors in Paris receive from 5,500 to 6,500 francs and the professors in the departments from 3,500 to 5,500 francs.

By the decree of December 22, 1830, no one can be appointed archbishop, bishop, vicar general, member of the chapter, or pastor of a chief city of a department or arrondissement unless he has obtained the degree of licentiate of theology or for fifteen years exercised the functions of a curate. Degrees, in fact, are no longer an absolute necessity for any ecclesiastical function.

The budget of the faculties of Catholic theology amounted to 166,400 francs in 1878, against 114,235 francs in 1868. There are five Catholic faculties, viz: Paris, with 7 chairs; Aix, with 5 chairs; Bordeaux, with 6 chairs; Lyons, with 5 chairs; and Rouen, with 5 chairs.

2. *Faculties of Protestant theology.*—The faculty of Strasburg was transferred to Paris by decree of March 27, 1877. The faculties of Paris and Montauban have each a seminary in which the government sustains scholarships filled by the minister of public instruction.

The salaries of the professors range from 4,500 to 6,500 francs. The budget of the Protestant faculties amounted to 79,600 francs in 1878, against 51,565 in 1868. The faculty of Paris has four and that of Montauban eight professors.

3. *Faculties of law.*—The professors at Paris receive a salary of 15,000 francs, and those in the departments from 6,000 to 11,000 francs.

The budget in 1878 amounted to 1,634,000 francs, against 1,005,626 francs in 1868.

The number of faculties of law is 12, viz: Paris, with 19 chairs, 19 professors, and 10 agrégés; Aix, with 9 chairs, 7 professors, and 2 agrégés; Bordeaux, with 11 chairs; Caen, with 9 chairs, 9 professors, and 4 agrégés; Dijon, with 9 chairs, 8 professors, and 1 agrégé; Douai, with 9 chairs, 3 professors, and 9 agrégés; Grenoble, with 9 chairs, 7 professors, and 2 agrégés; Lyons, with 10 chairs, 2 professors, and 10 agrégés; Nancy, with 9 chairs, 7 professors, and 4 agrégés; Poitiers, with 9 chairs, 9 professors, and 2 assistants; Rennes, with 10 chairs, 7 professors, and 3 agrégés; and Toulouse, with 11 chairs, 11 professors, and 4 agrégés.

4. *Faculties of medicine.*—The salaries of the professors are at Paris 13,000 francs and in the departments from 6,000 to 10,000 francs. The agrégés receive from 3,000 to 4,000 francs. The budget for 1878 amounted to 1,821,500 francs, against 834,500 francs in 1868. The faculty of medicine of Paris has 64 professors and assistants; the faculty of Montpellier, 35; and the faculty of Nancy, 30.

5. *Faculties of sciences*.—At Paris the professors receive a salary of 13,000 francs and in the departments from 6,000 to 10,000 francs. The *agrégés* receive 2,000 francs. The budget for 1878 amounted to 1,657,100 francs, against 841,900 francs in 1868. The faculty of Paris has 19 chairs and 32 professors and assistants; Besançon, 7 chairs and 7 professors and assistants; Bordeaux, 8 chairs and 9 professors and assistants; Caen, 6 chairs and 6 professors; Clermont, 6 chairs and 5 professors and 1 assistant; Dijon, 6 chairs and 6 professors; Grenoble, 7 chairs and 7 professors; Lille, 8 chairs and 9 professors and assistants; Lyons, 9 chairs and 11 professors and assistants; Marseilles, 7 chairs and 6 professors and 1 assistant; Montpellier, 7 chairs and 7 professors and 1 assistant; Nancy, 8 chairs and 10 professors and assistants; Poitiers, 6 chairs and 5 professors and 1 assistant; Rennes, 7 chairs and 6 professors and 1 assistant; Toulouse, 8 chairs and 11 professors and assistants.

6. *Faculties of letters*.—The professors at Paris receive a salary of 15,000 francs and in the departments from 6,000 to 11,000 francs. The *agrégés* receive from 2,000 to 3,000 francs. The budget of the faculties of letters in 1878 amounted to 1,075,100 francs, against 630,595 in 1868. The faculties of letters are: Paris, with 13 chairs and 20 professors and assistants; Aix, with 5 chairs and 6 professors and assistants; Besançon, with 5 chairs and 5 professors; Bordeaux, with 8 chairs and 11 professors and assistants; Caen, with 6 chairs and 5 professors and 1 assistant; Clermont, with 5 chairs and 6 professors and assistants; Dijon, with 5 chairs and 4 professors and 1 assistant; Douai, with 5 chairs and 5 professors and 1 assistant; Grenoble, with 5 chairs and 5 professors; Lyons, with 8 chairs and 10 professors and assistants; Montpellier, with 6 chairs and 8 professors and assistants; Nancy, with 7 chairs and 12 professors and assistants; Poitiers, with 5 chairs and 6 professors and 1 assistant; Rennes, with 5 chairs and 5 professors and 1 assistant; Toulouse, with 7 chairs and 8 professors and assistants.

7. *Superior schools of pharmacy*.—The salary of the professors ranges from 8,000 to 10,000 francs at Paris and from 6,000 to 8,000 francs in the departments. The budget of these schools amounted to 439,150 francs in 1878, against 200,400 francs in 1868. The superior school of pharmacy of Paris has 9 chairs and 18 professors and assistants; Montpellier has 5 chairs and 5 professors and 1 assistant; and Nancy, 5 chairs and 5 professors and 1 assistant.

8. *Full course schools (écoles de plein exercice) and preparatory schools of medicine and pharmacy*.—The preparatory school of medicine and pharmacy of Marseilles was declared a full course school by decree of November 26, 1875. The school has 18 chairs and 27 professors and assistants. The school of medicine and pharmacy of Nantes has 17 chairs and 25 professors and assistants. The school of Marseilles granted 42 diplomas in 1876, and the school of Nantes 29 in the same year. The preparatory schools of medicine and pharmacy are: Algiers, with 9

chairs; Amiens, with 10 chairs; Angers, with 11 chairs; Arras, with 8 chairs; Besançon, with 8 chairs; Bordeaux, with 13 chairs; Caen, with 9 chairs; Clermont, with 10 chairs; Dijon, with 8 chairs; Grenoble, with 10 chairs; Limoges, with 10 chairs; Lyons, with 9 chairs; Poitiers, with 10 chairs; Rheims, with 10 chairs; Rennes, with 13 chairs; Rouen, with 12 chairs; Toulouse, with 13 chairs; and Tours, with 10 chairs.

9. *Preparatory schools for superior education in sciences and letters.*—These schools were established by decree of August 22, 1854. The course of study lasts two years, and is essentially practical, as the students intend to enter upon commercial and industrial careers. The branches of instruction are mathematics, mechanics, physics, chemistry, natural history, French literature and history, physical and political geography, and drawing. These schools are situated at Angers, with 9 chairs; Chambéry, with 9 chairs; Nantes, with 9 chairs; and Rouen, with 11 chairs.

THE LIBRARY OF THE UNIVERSITY.

This collection owes its origin to the liberality of a former rector, Gabriel Petit de Montempuys, who bequeathed his library to the University July 11, 1762. To this first collection of 4,000 volumes a series of more important books was added by the purchase of the library of the Jesuits after the suppression of their order. The Jesuit college Louis-le-Grand was at the same time added to the University. Three years later, in 1767, the University purchased the library of a former rector, Paul Hamelin.

The solemn opening of the library took place December 3, 1770, but the catalogue was only completed several months later, March 7, 1771. This document shows that the collection consisted at that time of 19,353 printed volumes and 509 manuscripts. Until the close of the year 1846 the library of the University was only open to members of the University on Mondays, Wednesdays, and Saturdays. The budget amounted to 16,000 francs. November 20, 1846, the budget was raised to 35,200 francs, and from January 1, 1847, the public was also admitted to the library from 10 A. M. to 3 P. M. every day. For members and students of the University it was open from 7 to 10 P. M. daily. The total number of volumes was 109,235 in 1878, when the budget amounted to 36,000 francs.

PRIVATE INSTITUTIONS FOR SUPERIOR EDUCATION (ENSEIGNEMENT SUPÉRIEUR LIBRE).

The law on the liberty of superior education of July 26, 1875, made this phase of instruction free and authorized private citizens and associations to establish free faculties and universities. Thus far only the Catholic ecclesiastical authorities have availed themselves of this privilege and established several institutions which are making rapid progress. The law authorizes these private institutions to confer degrees,

and this seems to be one of the reasons why the leaders of the reform propose to alter the work of 1875. The present minister of public instruction, Mr. Jules Ferry,¹ has submitted a bill to the Chambers in which he proposes to replace the University in its old position and to limit the powers of the so-called free universities and free faculties. The bill provides that no member of a religious body which is not recognized by the state shall be free to teach, and that academic degrees shall be open only to candidates who are examined by the state universities and are entered on their books.

The following are the free universities and faculties established by the Catholic ecclesiastical authorities:

1. *The Catholic University of Angers*, established December 5, 1877. This institution has a faculty of law with 16 chairs and courses, a faculty of sciences with 11 courses, and a faculty of letters with 12 courses.

2. *The Catholic University of Lille*, established in 1875. This university has a faculty of law with 19 chairs and courses, a faculty of medicine and pharmacy with 19 chairs and 26 complementary courses, a faculty of sciences with 11 chairs, a faculty of letters with 7 chairs, and a theological college with 11 courses.

Regular attendance at the lectures is strictly enforced at Lille. Examinations are obligatory for all the faculties, and the parents of students are informed of the progress their sons have made and their conduct during each term.

3. *The Catholic University of Lyons*, established in 1877. This institution has a faculty of law with 10 chairs and 6 courses and conferences, a faculty of sciences with 7 chairs, and a faculty of letters with 6 chairs.

4. *The Catholic University of Paris*, organized in 1876. This university has a faculty of law with 15 chairs, 3 courses, and 11 conferences, a faculty of letters with 10 chairs, and a faculty of sciences with 10 chairs.

5. *The Catholic faculty of law at Toulouse*. This faculty was established November 16, 1877, and has at present 13 chairs.

¹As this work is going through the press M. Ferry has been superseded by M. Paul Bert.

The following table shows what the five free universities and faculties have accomplished since 1875:

Table showing the condition of the free universities and faculties from 1875 to 1878.

Place.	Number of matriculated students.	Examinations passed.		Diplomas obtained.	
		Before the state faculties.	Before the special jury.	From the state faculties.	From the special jury.
1875-'76.					
Faculties of law:					
Angers	192	24	.....	3	.....
Lille	191	25	.....	6	.....
Lyons	244	64	.....	10	.....
Paris	504	23	52	.....	6
Total	1,131	136	52	19	6
Faculty of sciences:					
Paris	6	.....	.....	.....	.....
Faculty of letters:					
Paris	36	1	.....	1	.....
1876-'77.					
Faculties of law:					
Angers	316	63	.....	14	.....
Lille	239	12	30	2	11
Lyons	448	91	.....	19	.....
Paris	761	42	145	8	40
Total	1,764	208	175	43	51
Faculty of medicine and pharmacy:					
Lille	21	.....	.....	.....	.....
Faculties of sciences:					
Lille	7	.....	.....	.....	.....
Paris	32	4	.....	3	.....
Total	39	4	.....	3	.....
Faculties of letters:					
Angers	24	1	.....	.....	.....
Lille	33	2	.....	2	.....
Paris	41	9	2	3	1
Total	98	12	2	5	1

Table showing the condition of the free universities, &c.—Continued.

Place.	Number of matriculated students.	Examinations passed.		Diplomas obtained.	
		Before the state faculties.	Before the special jury.	From the state faculties.	From the special jury.
1877-78.					
Faculties of law:					
Angers	468	82	38	25	13
Lille	209	13	52	3	14
Lyons	424	108	50	27	11
Paris	1,041	105	224	22	69
Toulouse	208	34	.....	18	.....
Total	2,350	342	364	95	107
Faculty of medicine and pharmacy :					
Lille	359	.....	.....	.....	.....
Faculties of sciences:					
Angers	16	.....	.....	.....	.....
Lille	18	2	.....	.....	.....
Lyons	8	.....	.....	.....	.....
Paris	28	3	.....	1	.....
Total	70	5	.....	1	.....
Faculties of letters:					
Angers	16	2	.....	.....	1
Lille	48	3	.....	.....	.....
Lyons	88	2	.....	.....	1
Paris	37	7	.....	.....	3
Total	189	14	.....	.....	5

REPEAL OF THE PRINCIPAL FEATURES OF THE LAW OF 1875.

The law of July 26, 1875, authorized the establishment by private citizens or associations of free or private universities. The bishops of France availed themselves of this privilege and established the so-called Catholic universities of Angers, Lille, Lyons, Paris, and Toulouse. The statistics given in the above table show that these institutions have made rapid progress. The majority of the liberal party in France saw, however, that they had made a mistake in granting private institutions the privilege of conferring degrees. M. Jules Ferry had always been opposed to the law of 1875, and as soon as he became minister of public instruction, in 1879, he at once submitted a bill to the Chambers not only repealing the privileges voted to private universities in 1875, but also excluding from all grades of public and private schools teachers who are members of non-authorized religious orders. This bill was passed with the exception of Article 7, which excluded non-authorized religious orders from the schools. Soon after the passage of the bill, of which the

following is the text, the former Catholic universities assumed the name of Catholic institutes.

THE FERRY BILL ON THE LIBERTY OF SUPERIOR INSTRUCTION.

Following is the text of M. Jules Ferry's original bill on the liberty of superior instruction, submitted to the Chambers in March, 1879:

ARTICLE 1. The examinations and practical tests which determine the granting of degrees can only be made in the superior state schools.

ART. 2. Students of public and private superior schools are subject to the same regulations as to study, especially as regards age, capacity, matriculation, practical work, probation in hospitals and dispensaries, &c.

ART. 3. Students of private superior schools have to register their names in the state faculties at a date fixed by the regulations. The matriculation is gratuitous both for students of state and private schools. The examination fees shall be fixed by the superior council of public instruction after consultation with the ministry of finance.

ART. 4. The law recognizes two kinds of superior schools: (1) The schools or groups of schools established or maintained by the communes or the state, which take the name of universities, faculties, or public schools; (2) the schools established or maintained by private individuals or by associations, and which can take the name of private schools only.

ART. 5. The titles and degrees of *agrégé*, doctor, licentiate, bachelor, &c., can only be conferred upon persons who have undergone the prescribed examinations before the state faculties.

ART. 6. The opening of isolated courses is subject to the provisions of the law of July 12, 1875.

ART. 7. No person belonging to a non-authorized religious congregation (priest, brother, or sister) is allowed to teach in a public or private school of any kind.¹

ART. 8. No private school or association organized for educational purposes can be recognized as an institution of public utility, except by law.

ART. 9 confirms the penalties fixed by the law of 1875.

ART. 10. All laws, decrees, and regulations contrary to the present law are abrogated.

SCHOOLS OF THEOLOGY.

According to the *Annuaire de l'enseignement libre pour 1879*, France had 93 higher theological seminaries (*grands séminaires*) for the training of Catholic priests; 34 of these seminaries are under the control of secular priests and the rest under that of religious orders. The number of students is not given. Besides the "*grands séminaires*" there are the "*petits séminaires*" (preparatory seminaries), from which the higher seminaries are recruited. Every diocese has at least one preparatory seminary. The number of pupils is not reported. The various religious orders have their own schools of theology, in which novices are trained for their calling.

¹ This article passed the Chambers but was rejected by the Senate.

THE SUPERIOR NORMAL SCHOOL AT PARIS.

The following translation of a letter addressed to the Commissioner of Education shows the present organization of this excellent school:

SUPERIOR NORMAL SCHOOL,
Paris, October 2, 1880.

SIR: The director of the Superior Normal School has received your letter of June 9, and I am directed to answer it.

You may have seen in the report of M. du Mesnil what our school is. It prepares for the competitive examinations. It trains professors, savants, writers. The course of study lasts three years. At the end of the first year, the student may present himself for the licentiate of letters or the licentiate of science, according to the division of the school to which he belongs. At the end of the third year the student presents himself for one of the orders of "aggregation" established in the university: philosophy, history, letters, grammar, for students of the section of letters; mathematics, physics, for students of the section of sciences. The licentiate and the aggregation are obtained by means of competitive examinations (*concours*), open to all those who fulfil certain specified conditions. At these examinations the students find themselves, therefore, in the presence of foreign competitors. The jury is, besides, composed of professors or high functionaries of the University who are strangers to the school. Very often the students of the school receive the first places. The school does not judge its own work; hence its merit and good reputation. Its professors have nothing to do with university degrees.

You ask for the latest programme of studies of our school. It is very difficult to satisfy you in this respect, for we have no programme, properly speaking. The professors who have charge of the first year's course conform their lessons to the programme of science; but while they follow this programme they go beyond it. The professors who have charge of the third year assist their pupils in the preparation of the programme of aggregation. Of course these programmes are not made at school, but by the jury of the competitive examinations. The programme for the licentiate of letters is modified every three years; those of the different aggregations vary every year.

The course of study for the section of letters comprises, moreover, philosophy, ancient and modern history, classical philology, the history of Greek, Latin, and French literature, and, finally, the modern languages. It is not to be understood that all these subjects are studied in their whole extent: the aim is less to know everything than to know well what is studied.

The professor of philosophy himself arranges every year, with entire liberty, the subject he wishes to treat; the professor of history limits his course to a civilization, a period, a determined country, and there he begins the true history anew by going to the sources and by a careful research in documents and texts. All the other professors act in the same way: their aim is to work before their pupils, in order to make them capable of working independently. Erudition is found in books, and the students of the school know how to find it. But what is found nowhere, and what the professor alone can impart, is method. There is the true connecting link of the two sections of the school, sciences and letters. The students of science have at their disposal large and celebrated laboratories, that of M. Sainte-Claire Deville and that of M. Pasteur. Experiments are made before their eyes. They see how a discovery is made. All this is living pedagogy.

Besides, the student very often takes the place of the professor; the student gives the lesson and the professor listens. You may have seen in M. du Mesnil's report what our "conferences" are. They, too, form a peculiarity of the school. Moreover, ordinarily a student has nothing to do but to learn; here he must teach, not everything, but a subject which he masters, which he has studied thoroughly, and which he has,

in many cases, selected himself. After the lesson the professor resumes his work and criticises, if necessary, what he has heard. All the students take part in the discussions, and it is by this method that everybody takes an interest in the search of the truth. This is, as it were, the fundamental principle of the school.

These are, dear sir, a few remarks concerning the Superior Normal School intended to show its original character. Should you desire information on other points, we shall be pleased to furnish it.

Accept, dear sir, the assurance of my respectful consideration.

HENRY MICHEL,

Secretary of the Superior Normal School, Agrégé of Philosophy.

SCHOOL OF POLITICAL SCIENCES.

The School of Political Sciences is situated at No. 15 Rue des Saints-Pères, Paris. While a private institution, it has for trustees such men as Senator Laboulaye, Count L. de Ségur, M. Taine of the Academy of France, Baron d'Eichthal, several members of the Institute of France, of the French Chambers, and of the diplomatic corps.

The school is in charge of Director Émile Boutmy, member of the Institute and of the French superior council of public instruction. Among the professors, who number twenty-nine, we notice the names of M. Levasseur, member of the Institute; M. de Foville, chief of the bureau of statistics; M. Glasson, professor at the faculty of law, and M. Janet, member of the Institute. The course of study lasts two years and embraces the following subjects: Comparison of administrative organizations, details of various systems of administration, financial systems at home and abroad, public revenues and taxes, public accounts, financial legislation, political economy, comparison of commercial legislation in various countries, history of commercial treaties since 1786, the French customs system, history of the formation of the principal states and their international relations in the Middle Ages, history of treaties from the peace of Westphalia till 1789, analysis of the principal treaties from 1648 to 1789, diplomatic history of Europe from 1789 to the present time, organization of diplomatic services, constitutional history of France, England, and the United States during the last 100 years, parliamentary and legislative history of France from 1789 to 1852, analysis of the constitutions of Belgium, Switzerland, Germany, Austria, Hungary, and Italy, the law of nations, international law as a result of treaties (capitulations, extradition, industrial property, &c.), consular service, geography and ethnography, commercial statistics, industrial and commercial geography, comparison of civil legislation, and modern languages.

The sessions begin in November and close in June. The tuition fees for all the courses amount to 130 francs a year; for single courses the charges are from 25 to 40 francs a week. For the use of the library the student pays 25 francs a year. The school is open every day, except Sundays, from 8.30 A. M. to 4 P. M.

At the end of the course the students who have successfully passed the prescribed examination receive a diploma.

In order to give it a permanent character, it is the intention of the French government to adopt the school.

CENTRAL SCHOOL OF ARTS AND MANUFACTURES, PARIS.

The account of this school here given is taken from the *Histoire de l'École Centrale des Arts et Manufactures depuis sa fondation jusqu'à ce jour*, by Ch. de Comberousse, Paris, 1879.

HISTORICAL SKETCH.

The Central School of Arts and Manufactures, which Perdonnet styled the "Sorbonne industrielle" of France, was founded in 1829 by private initiative. Everybody knows what importance industry acquired under the Restoration. Great desires and great thoughts were agitating men's minds. From this time may be dated the preliminaries of the creation of the *École Centrale*. The four founders of the institution were MM. Olivier, Pécelet, Lavallée, and Dumas. Of this group of eminent men, M. Dumas, the well known chemist, alone survives.

The school was opened November 3, 1829. The title of its first programme indicated its object; it was "Central School of Arts and Manufactures, intended to train civil engineers, directors, and foremen of manufactories, &c., founded, with the approval of M. Vatimesnil, minister of public instruction, by M. Lavallée, director, and MM. Benoit, Dumas, Olivier, and Pécelet, professors."

During the first year the courses were followed by 140 pupils, 48 of whom were over 21 years of age. These unexpected pupils were ambitious manufacturers, who did not hesitate to quit their establishments for a while in order to acquire at the *École Centrale* the scientific training of which they felt the need. Foreigners, too, responded to the call of the school. Pupils arrived from Spain, Greece, Germany, Switzerland, and America. The programmes of the school had been translated into nearly every language, and it may be said that they have become starting points for numerous improvements introduced into some of the scientific schools of Europe.

The first course of lectures was opened by Professor Pécelet. He gave a long series of lectures on national industries. His course on industrial physics was so highly appreciated that it has been imitated in foreign countries. The first director of the school was M. Lavallée. He had charge of the administration, representation, and correspondence of the school. A council composed of professors aided him in this task.

During the first years the age required for admission was fixed at 15, but no maximum age was fixed. As it became evident, however, in 1835, that the age of 15 was too low for admission to the courses, which require a certain maturity of intellect, the minimum age was fixed at 61, which age was also required for admission to the polytechnic school. No maximum age was, however, prescribed, and the school has had no

reason to regret it. The statistics have never indicated that the older pupils were less studious, less docile to discipline, or less successful in their studies than their younger comrades. If the maximum age of 20 had been adopted, as is the case at the polytechnic school, the *École Centrale* doubtless would have prevented the admission of more than half of those who have done most honor to the school and who have derived the greatest benefit from its lessons.

PRESENT CONDITION.

Under the wise management of its eminent directors and professors, the *École Centrale* has steadily improved from the outset, and the number of students has risen from 140 in the first school year (1829-'30) to 550 in 1879. With much skill and energy M. Lavallée directed the institution till 1862, when he was succeeded by M. Perdonnet. In 1857, when the number of students had risen to 475 and the school was highly prosperous (the net income exceeding 100,000 francs), M. Lavallée, refusing brilliant offers of an association of former students, proposed to turn over the institution gratuitously to the state. This was carried out, the government taking upon itself the obligation to pay a life pension to the founders and first professors of the school and to some of their dependents.

Since its adoption by the state in 1857, the school has continued under the ministry of agriculture, commerce, and public works. Its main object is to train engineers for all branches of industry and for public works the direction of which does not necessarily belong to the government engineers.

Diplomas of engineers of arts and manufactures are delivered annually by the minister to the pupils designated by the school council as having passed through the entire competitive examination in a completely satisfactory manner. Certificates of capacity are granted to those who, not having passed all the subjects of the examination, have nevertheless given proof of sufficient knowledge in the most important branches.

The school receives day scholars only. Foreigners are admitted on the same conditions as natives. The duration of the studies is three years. The tuition fees are 800 francs a year; this includes fees for manipulations. Assistance may be given by the state to needy pupils recommended by the high position they take in the examinations of the school. This aid is for one year only, but may be continued, and even augmented, in favor of pupils who render themselves worthy of it.

Admission to the school can only be obtained by means of competitive examination. The examination is public in so far as it is oral; it takes place every year.

All candidates must prove that they were 17 before the 1st of January of the year in which they present themselves for examination; they also must produce certificates of vaccination and of good character.

candidates pay no examination fees. At the conclusion of the examination the list of pupils to be admitted is definitely fixed by the minister on the recommendation of the school council.

From its foundation to the present year the school has furnished industry with 4,054 engineers, 552 of whom have been foreigners; all these have gained the engineer's diploma. The total number of students admitted is 7,266. It will be readily conceived what an influence the school must have exercised on French industry and the international relations of the country. Especially in the construction of railways in France since 1835 has its influence been apparent. The council of the school, foreseeing this field of activity, in 1834 appointed a special course of lectures on railway construction—the first course of this kind in Europe. In 1863, among former students of the school were 28 railway managers and chief engineers, and 79 principal and 56 ordinary engineers. Through the special education provided in the school, French manufacturers were enabled to pass easily from the system of universal to that of limited protection, and a large number of iron founders, machine constructors, farmers, manufacturers of chemical products, sugar, paper, &c., have received their scientific knowledge and skill from the École Centrale. At the Universal Exhibition of London, in 1851, 3 council medals and 17 prize medals were awarded to former pupils of the school, and at the Universal Exposition of Paris in 1855 they received 10 appointments to the Legion of Honor, 10 grand medals of honor, 17 medals of honor, 50 first class medals, 21 second class medals, and 14 honorable mentions.

At the Universal Exposition of Paris in 1867 more than 500 former pupils participated as exhibitors or collaborators; 248 received awards of all kinds, of which 5 were grand prizes, 65 gold medals, and 8 appointments to the Legion of Honor. At the Exposition in 1878 the number of former pupils who participated in some capacity was 841, of whom 35 were members of the international jury. Of the 841, 340 were decorated or received prizes.

COURSE OF STUDY.

The course of study lasts three years and is arranged as follows :

First year.

(Figures in parentheses following the subjects taught indicate the number of lessons.)

Days.	8.30 A. M.	11.30 A. M.	From 1 to 4 P. M.
Monday	Machine construction (22). Natural history (35).	Architecture (24). Mechanics (45).	Exercises in chemistry (20, of 2 hours each). Exercises in physics (16, of 30 minutes each). Exercises in mineralogy (14, of 30 minutes each). Exercises in practical stereotomy (4, of 3 hours each). Exercises in practical topography (2, of 3 hours each). Exercise in house construction (1).
Tuesday	Chemistry (60)...	Mathematics (30). Geology and mineralogy (30).	
Wednesday ..	Descriptive geometry (60).	Physics (60).	
Thursday ...	Elements of machine construction.	Architecture, mechanics.	Exercises in descriptive geometry (16). Exercises in physical science (2). Exercises in mechanical science (2). Exercises in architecture (15). Exercises in machine construction (25).
Friday	Chemistry	Mathematics, geology, and mineralogy.	
Saturday	Descriptive geometry.	Physics.	

Second year.

(Figures in parentheses following the subjects taught indicate the number of lessons.)

Days.	8.30 A. M.	11.30 A. M.	From 1 to 4 P. M.	
Monday	Zoötechnics (20). Steam engines (38).	Machine construction (50). Industrial legislation (20).		Visits to ateliers and manufactories. Execution of 9 special projects.
Tuesday	Industrial physics (45). Working of mines (24).	Application of the resistance of materials (25). Technology (35).		
Wednesday..	Practical mechanics (55).	Civil construction (50). Classification of plants (20).	From 2.30 to 4 P. M. Analytical chemistry (50).	
Thursday ...	Zoötechnics, steam engines.	Machine construction, industrial legislation.		Exercises in chemistry (27, of 3 hours each). Exercises in topography (3, outside of the school). Exercises in industrial physics (4, of 4 hours each).
Friday	Industrial physics, working of mines.	Application of the resistance of materials, technology.		
Saturday....	Practical mechanics.	Civil construction, classification of plants.	Analytical chemistry.	

Third year.

(Figures in parentheses following the subjects taught indicate the number of lessons.)

Days.	8.30 A. M.	11.30 A. M.	From 1 to 4 P. M.	
Monday	Metallurgy (54) ..	Working of mines (16). Railways (42)		Execution of 6 special projects. Projects for competition from June 25 to July 25.
Tuesday	Industrial chemistry (48).	Machine construction (53).	From 2.30 P. M. to 4 P. M.	
			Rural economy (20).	
Wednesday ..	Practical mechanics (45).	Public works (55).	Industrial legislation (10).	
Thursday ...	Metallurgy	Working of mines. Railways.		Exercises in chemistry (16). Commercial essays. Visits to ateliers and manufactories.
Friday	Industrial chemistry.	Machine construction.	Rural economy.	
Saturday	Practical mechanics.	Public works.	Industrial legislation.	

The school opens at 8.30 A. M. ; lessons from 8.30 to 10 A. M. ; breakfast from 10 to 11 A. M. ; roll call from 11 to 11.30 A. M. ; lessons from 11.30 A. M. to 1 P. M. ; practical work from 1 to 4 P. M.

ÉCOLE DES PONTS ET CHAUSSEES.

The School of Bridges and Roads was established during the last century to train engineers for the government service.

The students are divided into three classes: engineer or regular students, private students, and attendants on lectures (*auditeurs*). The engineer students, all Frenchmen, are taken exclusively from pupils who have finished the course at the polytechnic school. In addition to the engineer students, the school admits both French and foreign private students. These students are allowed, after a satisfactory examination, to attend the lectures. The simple hearers are admitted, without examination, by the director. The two last classes of students cannot receive the diploma of government engineer.

The course of instruction comprises the construction of roads, bridges, railways, canals, maritime ports; the improvement of rivers; civil architecture; applied mechanics (resistance of materials and hydraulics); steam engines; agricultural hydraulics; the geological and mineralogical knowledge indispensable to engineers; administrative law; political economy and fortification; graphic works; drawing; shading; preparation of papers and competition on projects of works of art and construction; levelling and surveying; drawing plans of machines and buildings; visiting manufactories; working of railways; electric telegraphy; photography; pisciculture; vicinal service; sanitary improvements of towns, &c. The course of study lasts three years. The lectures commence in the early part of November. At the close of the month of May, the engineer students are sent into the departments to be exercised in engineering studies under the direction of the chief engineers of the service. This experience is continued till October.

In order to enable French or foreign candidates to pass the preliminary examination, a preparatory course has been instituted for the benefit of young men desirous of admission as private students. The preparatory course of study continues for a year and comprises: (1) the differential calculus, the integral calculus, and mechanics; (2) physics and chemistry; (3) descriptive geometry, stereometry, and the elements of architecture; (4) linear drawing, model drawing, and shading.

All the candidates for admission must pass a preliminary examination, both for the preparatory course and for the position of private students. This examination is obligatory in all cases. The school has one of the richest collections of works in existence relating to engineering science, the number of volumes being not less than 40,000. Engineers are admitted at all times for the purpose of consulting works or manuscripts. Engineers not residing in Paris are authorized to borrow books from the library.

The galleries of models of the school contain more than 1,200 models or designs, divided into 11 classes, corresponding to the various courses of construction. Many of these models are of great value and possess

a special interest in consequence of the delicacy and excellence of their construction.

The origin of the office of designs and drawings is contemporary with the establishment of the school, and the principal duty performed here is the preparation of all draughts or designs necessary for demonstration in the lecture room. With the aid of a new and powerful auxiliary, the photographic studio, this office is employed simultaneously in preparing the periodical publication known under the name of "Portfolio or collection of designs distributed to the students" and in compiling the Atlas of the Ports of France, the first four volumes of which have been published. The same office performs the additional work entailed by the different universal exhibitions.

The object of the school's depot for instruments of precision is to preserve, in good condition, the instruments used by the students for land work. The operations of this department have been greatly extended, and they now embrace orders for new instruments and the reception and repairs of all instruments granted by ministerial decision to the engineers in France and the French colonies. The "depot" also receives and stores the instruments for which engineers have no further use. These instruments are thoroughly repaired and forwarded to places where they are required. The depot of machines corresponds to a requirement of the same kind. It orders, receives, and forwards all machines and apparatus the purchase of which is requested by engineers and approved by the minister. In it are centralized and stored the most valuable materials that are left without any definite use when works are finished.

The scientific instruction of the courses of lectures is completed every year by a series of experiments calculated to give to the students practical ideas as to the elements of construction. This was the object of the establishment of the experimental workshop at the Trocadéro. In addition to this, it encourages the progress of the science of construction by furnishing the professors of the school and other engineers with the means for study and experiments difficult to procure in any other way without considerable expense.

The organization of the experimental workshop at the Trocadéro was commenced in 1867; it is now nearly completed.

After the fine discoveries of Vicat, it was considered necessary to familiarize the engineer students with chemical analysis as applied to the materials of construction. With this view a small laboratory, established in 1845, was soon utilized for the purpose of furnishing engineers with the necessary information upon chemical or physical subjects relating to their particular branches of service. The results obtained were sufficiently important to decide the government to order the definite organization of an office for assaying, to be annexed to the laboratory. The laboratory undertakes all chemical analyses and assays relative to materials of construction and substances connected with agriculture, espe-

CIRCULARS OF INFORMATION FOR 1881.

ly researches applying to lime, cement, mortar, plaster, building
ae, bricks, clay, sand, potable water and water for irrigation, arable
ls, manures and improvements.

The researches of the laboratory are not carried on for the exclu-
ve advantage of government engineers; private individuals may also
ave recourse to them in case of need. It is only necessary to send a
ritten application to the director of the school, inclosing a sample of
ne substance to be analyzed. The results of the process are trans-
mitted gratuitously to the person making the application; he has only
o pay the expenses of correspondence. From the date of its estab-
lishment to the close of 1872 the laboratory has received 5,096 applica-
tions for analysis, comprising nearly 23,000 samples.

THE NATIONAL SCHOOL OF MINES AT PARIS.

This school was first instituted in 1778, and subsequently reëstab-
lished in 1816. The control is vested in the minister of public works, and
the principal object of the school is to furnish the training necessary for
the engineers required by the government for the service of the mines.

Independent of the regular or engineer students, the school admits
private students, foreign students, and free students or hearers. The
engineer students, who are taken exclusively from those leaving the
polytechnic school, are alone eligible for the government service, and
are appointed by decree.

Private students are prepared for the various positions offered by
commerce and manufactures, and in particular to enable them to be-
come engineers or directors of mines or mineral works. They are ad-
mitted by competition.

Foreign students are admitted by a decision of the minister of public
works, at the request of the ambassadors or chargés d'affaires of foreign
powers, on the condition of successfully passing an examination with
regard to competency, which examination takes place once a year, in
the latter half of the month of October.

The free students are, at their own request, simply authorized by the
minister to follow the courses of lectures and practical studies of the
school. The private, foreign, and free students are expected to pay to
the school a sum of 35 francs for wear and damage of instruments, &c.

The course of study is identical for the various classes of students,
but the foreign and free students can only participate in the practical
studies in proportion to the number of places at disposal in the labora-
tory and drawing school.

At the close of each scholastic year the engineer and private students
pass examinations in the courses followed. Foreign students have the
option of presenting themselves, but free students are not admitted to
these examinations.

On leaving the school, engineer students are appointed engineers of
the third class, and private students whose acquirements are satisfac-

tory receive a diploma of merit, and are authorized to bear the distinction of brevetted student of the Paris National School of Mines.

Foreign students receive simply the brevet of merit.

To facilitate admission to the ranks of private students, preparatory courses were instituted at the school of mines by a ministerial decision of December 26, 1844. The preparatory studies consist of four oral courses of lectures and of practical exercises. The courses comprise: (1) ideas of infinitesimal analysis and mechanics; (2) descriptive geometry, pure and applied; (3) physical sciences, in relation to gas and vapors, heat, and optical instruments; (4) chemistry in general.

The principal objects of the instruction given at the school are the opening and working of mines and the treatment of mineral substances.

It embraces three years of study, and comprises, in addition to the lectures, practical exercises and travelling studies.

The students of the first year attend the seven courses of the working and machinery of mines, metallurgy, mineralogy, assaying, geology, palæontology, and surveying.

The students of the second year attend the second part of the four courses of the working of mines, machinery, metallurgy, assaying, and geology.

The students of the third year attend the five courses of railway construction, mining legislation, administrative law and industrial economy, agriculture, technical geology, and military fortification. The course comprises German and English, and the students are compelled to attend the course of one of these foreign languages.

The practical exercises are thus divided: During the term of study the students of the first and second year work alternately in the laboratory and the drawing class. They also study the collections of the school of mines and visit the manufactories and workshops in the neighborhood of Paris.

After the May examinations students of the first year are exercised in chemical analysis till July 15 and in surveying till August 15. The vacation commences at the latter date, but the students are expected to visit, for three weeks in September and October, one of the principal mining and smelting districts in France or Belgium.

During the first two weeks in June the students of the second year attend a course of geology under the direction of their professors, and in the summer they visit various mining and manufacturing districts. On their return they communicate the results of their observations in reports illustrated by drawings and sketches.

Each student of the third year is expected to prepare a plan of working a mine and a system of metallurgy according to the bases fixed by the council of the school, and the engineer students terminate their third year by a second journey for instruction of about a hundred days. On their return they are obliged, as before, to prepare reports on the

various establishments to which their attention has been drawn. The second journey is optional for the private students.

Examinations take place at the close of the school year upon all the subjects of study, including foreign languages (German and English). All examinations include a written composition in addition to the oral test. The students who have successfully passed the examinations required receive a diploma. Prizes are awarded to students who have distinguished themselves by their work at school or by their travelling journals. These facts are mentioned in the diplomas.

The authorities of the school cannot guarantee appointments for the private students, but, generally speaking, the influence and connections of the school are sufficient to procure positions more or less lucrative for the greater part of the students.

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CIRCULARS OF INFORMATION

OF THE

BUREAU OF EDUCATION.

No. 5-1881.

**CAUSES OF DEAFNESS AMONG SCHOOL CHILDREN AND ITS INFLUENCES
ON EDUCATION, WITH REMARKS ON THE INSTRUCTION OF PUPILS
WITH IMPAIRED HEARING AND ON AURAL HYGIENE IN THE
SCHOOLS, BY SAMUEL SEXTON, M. D., AURAL SURGEON TO
THE NEW YORK EYE AND EAR INFIRMARY, MEMBER
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LETTER.

DEPARTMENT OF THE INTERIOR,
BUREAU OF EDUCATION,

Washington, September 24, 1881.

SIR: The causes of deafness among school children are numerous and important enough to justify a special investigation of the subject, and I have requested Dr. Samuel Sexton, a distinguished aural surgeon of New York City, to prepare a paper on the subject.

The author has collected in the following pages some of the more practical conclusions regarding the causes of deafness among school children, together with suggestions of a hygienic and prophylactic nature drawn from his own observations among a large number of pupils in dispensary, hospital, and private practice.

Before commencing the general discussion of the subject, the writer deems it expedient to give a brief description of the structure of the ear, together with its physical and physiological functions, including the *modus operandi* of hearing.

The woodcut illustrating the deeper and invisible portions of the ear, it is believed, will materially aid the reader in arriving at a useful knowledge of the subject.

The sympathetic relations between the teeth and the ears are also fully considered, the influence of diseased states of the former on the acoustic organs of youth seeming to demand particular attention.

I would respectfully request the publication of Dr. Sexton's researches as a circular of information.

I have the honor to be, your obedient servant,

JOHN EATON,
Commissioner.

The Hon. the SECRETARY OF THE INTERIOR.

Publication approved.

S. J. KIRKWOOD,
Secretary.

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DEAFNESS AMONG SCHOOL CHILDREN.

STRUCTURE OF THE EAR.¹

From a study of Fig. 1 it will be seen that quite a large passage seems to traverse the base of the skull from ear to ear; this passage, however, does not extend directly athwart the head in such a manner as to im-

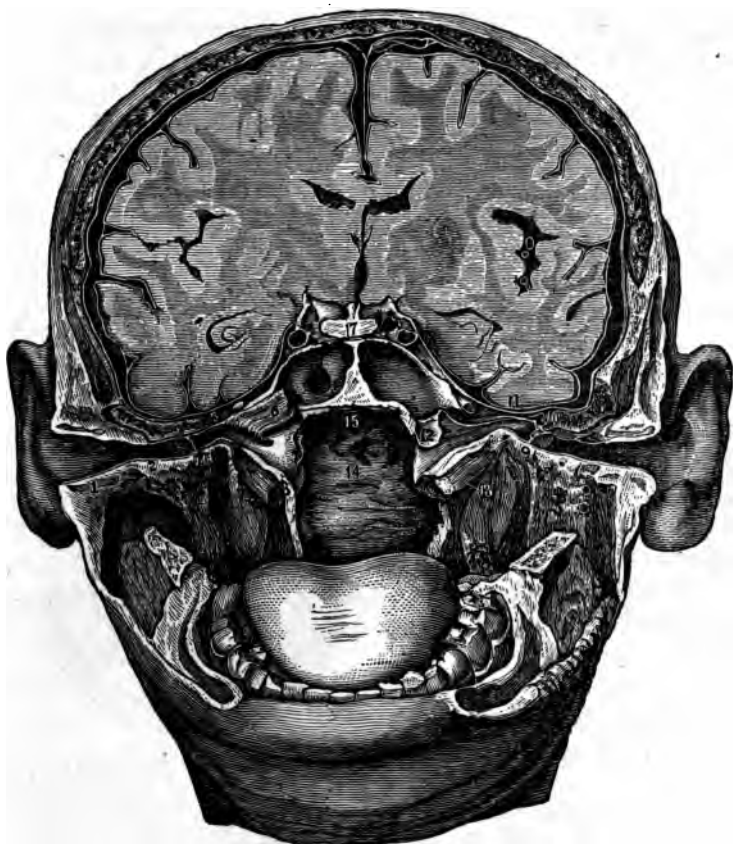


FIGURE 1.—(After Rüdinger).—Section through the head showing the auditory canal, drum, drum-head, and Eustachian tube of each side. 1, cartilage of the external auditory canal; 2, bony portion of external auditory canal; 3, 4, drum membrane of the right side; 5, drum cavity; 6, dilator muscle of the Eustachian tube; 7, 13, muscles which lift the soft palate; 8, mucous membrane of the pharyngeal orifice of the tube; 9, drum membrane of the left side; 10, hammer bone; 11, muscle which renders the drum membrane tense; 12, mucous membrane of the Eustachian tube; 14, 15, mucous membrane of the posterior surface of the pharynx.

¹The writer desires to acknowledge his indebtedness to Wm. Wood & Co., of New York, and Presley Blakiston, of Philadelphia, who have kindly loaned several of the cuts made use of in the following pages.

mediately connect the two ears together, for its connection is broken, as it were, in the pharynx, where it opens by two separate mouths.

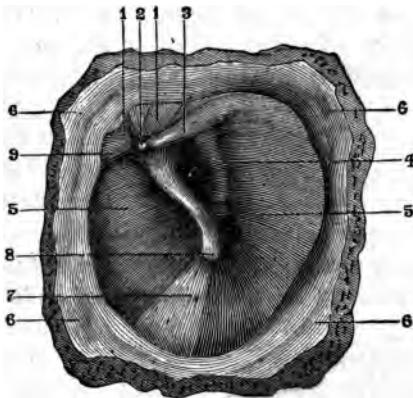


FIGURE 2.—Outer surface of the drum-head magnified about $3\frac{1}{4}$ times. 1, the flaccid part of the drum-head; 2, short process; 3, the back fold of the drum-head; 4, the anvil's long and descending limb shining through from behind the drum membrane; 5, the true membrane; 6, 6, 6, inner end of bony canal forming frame for drum-head; 7, the pyramid of light; 8, lower part of the hammer; 9, the front fold of the drum-head.

of skin which becomes very delicate at its inner end where it is reflected over the drum-head. The wax of the ear is secreted by numerous small glands situated near the centre of the auditory canal.

The *drum-head*,¹ or *membrana tympani* (Figures 2 and 3),² consists of a very thin skin, no thicker than tissue paper, which is stretched across the passage and closes in the drum. It is composed of three layers; the middle or fibrous layer being tough, gives it strength.

The *drum cavity*, or middle ear (tympanum), consists of the middle portion of the passage where it goes through the base of the skull. The drum is for the most part only a line or two in depth and about a half an inch in height and width; its inner wall, which consists of an irregular surface of bone, is perforated in

A description of the passage of one side will be sufficient, inasmuch as both are alike. From where the passage enters the head at the auricle—ear, in common parlance—to its inner termination in the pharynx, it measures about two inches and a half.

The *external auditory canal* comprises the outer portion of this passage; its course is inwards, with slight deviations, for about an inch and a half, where it is closed by the drum-head. It is nearly round, seldom large enough to admit the end of the little finger, and has a lining

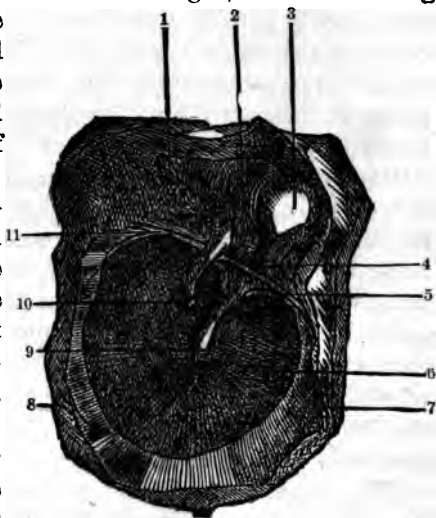


FIGURE 3.—Inner surface of the drum-head magnified about $3\frac{1}{4}$ times. 1, short limb of the anvil, attached to back part of outer bony wall of drum cavity; 2, body of anvil bone; 3, head of hammer bone; 4, neck of hammer; 5, 11, chorda tympani nerve (this marks also the boundary line of the pockets and folds of the drum-head, the latter being shown in Fig. 2, at 1 and 5); 6, front part of drum-head; 7, 8, bony frame around drum-head; 9, the lower part of the handle of the hammer-bone; 10, lower part of the long limb of anvil bone; to the point 10 the head of the stirrup bone is attached.

¹ The drum-head is liable to be incorrectly spoken of as the drum itself. As in the musical instrument known as the drum, the ear drum has a membranous cover (drum skin) which covers a hollow cavity (drum) containing air. The drum of the ear contains not only air but also the ear bones.

² From *Hearing, and How to Keep It*, by Charles H. Burnett, M. D.

two places, the openings leading into the labyrinth but closed by membrane; one of these openings receives the stirrup bone. The drum's dense bony case and its deep situation afford protection to the sound transmitting mechanism which it contains, and its unyielding walls allow of precision in the movements of the mechanism.

The drum-head veils the drum cavity outwardly, but owing to its translucency a glimpse is afforded of some of the structures within. The brain lies above the drum and is separated from it by a very thin plate of bone.

The Eustachian tube.—The inner portion of the passage which extends from the ear to the throat takes a somewhat downward course from the drum to its inner termination; this portion of the passage is a little more than an inch in length and is known as the Eustachian tube. The tube is very small where it leaves the drum, but it becomes gradually larger, and finally expands at its termination into quite a large trumpet-shaped mouth. The pharynx, which receives the inner extremity of the tube, is the superior termination of the air passages, and by means of this tube the air is conveyed upwards to the drum of the ear. The Eustachian tube is lined with mucous membrane. The mucus secreted in the drum cavity and along the tube passes into the throat. The drum cavity requires a constant supply of air from the throat in order to counteract the air pressure upon the drum membrane from without; this is accomplished by the act of breathing, every bellows-like movement of the lungs forcing little jets of air up through the Eustachian tube to the ear. Sound probably travels from the mouth to the ear through this tube, but we are unconscious of the fact unless the ear is diseased. The tube is liable to closure from colds, chronic nasal catarrh, and other causes, in consequence of which mucus is confined in the ear and the normal air supply is cut off. These disorders impair the hearing.

The sound transmitting mechanism.—That portion of the acoustic organ which sound waves set in motion is lodged in the drum cavity, whose deeply seated bony case affords it protection, besides providing the unyielding attachment which is necessary for the performance of its functions.

Besides the drum-head, or drum skin, as it is sometimes called, there are three ear bones concerned in this mechanism for the transmission of sound, namely: (1) The *hammer bone*, or malleus, which is joined to the top of the drum cavity; its handle comes down between

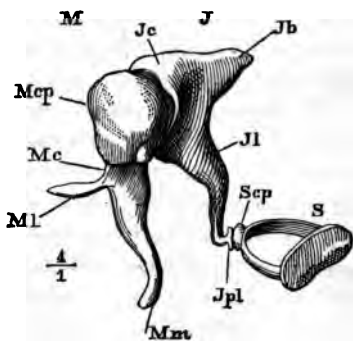


FIGURE 4.—Ear bones, or ossicles of the ear, in mutual connection, seen from the front and from the right side of the head, turned a little to the right round a vertical axis. M, hammer, or malleus; J, anvil, or incus; S, stirrup, or stapes; Mcp, head; Mc, neck; Ml, long process, or processus gracilis; Mm, handle, or manubrium, of the hammer; Jc, body; Jb, short process; Jl, long process; Jpl, orbicular process, or os orbiculare, or processus lenticularis, of the anvil; Sep, head, or capitulum, of the stirrup. The three ear bones are shown here enlarged four diameters. (Helmholtz.)

the layers of the drum-head and is moved to and fro with every vibration of the membrane. (2) The upper portion of the hammer is articulated to the *anvil bone*, or *incus*, to which all of its to and fro movements are communicated. (3) The anvil has a slender process projecting down into the drum cavity, on the end of which is attached the *stirrup bone* or *stapes*. The foot plate of the stirrup bone fits like a piston into one of the holes that lead from the drum cavity to the inner ear or labyrinth. Thus we have a chain of small bonelets extending from the drum membrane to the labyrinth; any impulse imparted to the drum membrane is immediately transmitted to the stirrup bone, which is driven with a piston-like motion into the labyrinth. The *mastoid cells* are small cavities of irregular size, the whole assemblage occupying a space as large as an almond, in the mass of bone which may be felt projecting behind the auricle. There is a direct communication between them and the drum, and they are liable to visitations of an inflammatory nature when it is affected.

The inner ear or labyrinth.—The affections of the inner ear are influenced so little by ordinary hygienic measures that I shall not attempt its description here. Should the reader feel inclined to acquire a knowledge of this part of the ear he will find the subject ably treated in the very interesting little book on *Hearing, and How to Keep It*.¹

The modus operandi of hearing.—The passage that extends from the auricle to the throat is mainly an *aërial conduit*; the currents of air entering it at either extremity would intermingle were it not for the head of the drum which is stretched across the passage. The thin skin composing the drum's head vibrates freely to all sounds from without near enough to disturb the air in contact with it, thus affording the motive power that sets the sound transmitting mechanism in motion. The *aërial vibrations* of which sound is composed, entering the ear through the external auditory canal, excite responsive movements of the drum-head similarly to the impulses of wind that move the sails of a windmill; with this difference, however, the sails of the mill receive the air impulses obliquely upon a plane surface which causes them to revolve, while the drum-head, being immovably attached to the bony walls of the auditory canal at its entire circumference and receiving the impulses of sound on a slightly concave surface, is simply driven inward by each sound-wave, its peculiar construction causing it to instantly return to its former position after each inward movement. Now every time the drum-head performs a to and fro movement the ear bones partake of the motion, and the stirrup, which fits like a piston into one of the orifices between the middle and inner ear, thus imparts an impression of each vibration to the nerve of audition. Every sound thus seems to cause a particular kind of plunge on the part of the piston. The range of the sound transmitting mechanism's movements is very remarkable; thus it has been determined by scientific experiments that its to and fro

¹ *Hearing, and How to Keep It*, by Charles H. Burnett, M. D. Philadelphia, Presley Blakiston, 1880.

movements exceed forty thousand per second in response to the higher notes, while shocks of sound requiring no more than sixteen vibrations per second may still be appreciated. It will thus be seen that the transmitting mechanism is capable of such rapid movements that the most intricate musical sounds impart their rhythm to the sense of hearing without any inharmonious break.¹

It is but fair to state that some authorities hold to the belief that the sound transmitting mechanism is incapable of presenting compound tones to the perceptive faculties as a whole, but that the function of the nerve of audition is to take cognizance of the separate elements of tones.

Noises in the head, or tinnitus aurium.—The transmitting mechanism in health does not permit sound to be heard through any other channel than the auditory canal; confusion naturally results, therefore, when unusual sounds are permitted to excite the auditory nerve irrespective of the motor of normal hearing. Sounds, therefore, that reach the sense of hearing by exciting the piston-like action of the stirrup bone, or otherwise, without the aid of the drum-head, interfere with the sounds which continue to be perceived as usual; hence vibratory movements arising from the circulation of the blood in the head, or from other physiological performances which are thus abnormally heard, constitute noises in the head. (See pages 21, 39.)

*Autophony.*²—When the hearing motor, the drum-head, loses its tension, or when any of the ear bones become separated from each other, sound in the external auditory canal sometimes fails to cause effectual movements of the mechanism; the hearing is then variable, one moment the voice and noises in the head are all heard confusedly together, and the next moment better hearing is experienced. Autophony and tinnitus aurium are symptoms that confuse the individual very much, although he may enjoy quite good hearing when the temporary interference is absent. (See pages 20, 39.)

CAUSES OF DEAFNESS AMONG SCHOOL CHILDREN.

The sense of hearing is impaired by so many causes to which children are exposed, many of them almost unavoidable, that it is unusual to meet with a child that has not experienced some aural disease. If we accept the statement as approximately correct that of the entire population not more than five in every hundred possess unimpaired hearing, some idea at least can be formed of the prevalence of this defect in youth.

The numerous causes of deafness are found to be distributed among all the different regions of the ear, and it will, therefore, be most convenient to consider them, as nearly as may be, in connection with the

¹ See Dr. Charles H. Burnett's interesting researches on this subject, *Arch. Oph. and Otol.*, vol. II, No. 2, p. 45.

² Autoph'ony, from αὐτός, self, and φωνή, voice—a symptom in aural affections causing the patient when speaking or singing to fancy that his own voice comes from within the head, instead of leaving the mouth and going around to the ear as usual. The voice of the affected person can, however, be heard by others.

part affected; I shall first allude to local causes, and then to such as are remote or general.

I. LOCAL CAUSES.

Affections of the auricle.—The auricle is liable to become inflamed from blows or when frosted; it may then swell up greatly and close the entrance to the auditory canal, thus causing more or less deafness; a like result sometimes follows an attack of eczema, or salt rheum, an affection to which some children are subject. Deafness from these causes is not very frequent, however.

Affections of the external auditory canal.—The auditory canal being easily inspected under a good light, any object that obstructs it can be readily discovered. The foreign bodies that are found in this canal usually consist of small objects that children themselves or their companions have carelessly introduced in play. Although these obstructions are usually visible to the eye, their removal is found to be by no means an easy task, as will appear further on.

Wax may collect in the canal and cause deafness by excluding sound, or it may become loose in the passage and lodge against the drum membrane, when intolerable noises in the ear will be experienced. Foreign bodies, by exciting the secretion of wax or by preventing its escape in the natural way, may give rise to deafness. The canal is also liable to be closed by inflammation. (See page 36.)

Affections of the drum [the drum-head, although constituting the hearing motor, is yet anatomically inseparable from the drum and always participates in its affections].

Injuries to the drum from violence.—The drum is vulnerable to violence from without. Slight blows upon the ear or striking upon it in falling may cause its injury; thus a slight *box on the ear* by the hand, suddenly compressing the air in the auditory canal, may rupture the membrane. Small implements such as are commonly carried about the person are sometimes violently thrust into the drum by sudden movements or unexpected blows while they are being used in the auditory canal. These injuries, which are, fortunately, of rare occurrence, involve to a greater or less extent the whole drum, the laceration and concussion being attended by other grave results. (See page 37.)

Affections of the inner ear, or labyrinth.—The consequences of impairment of the nerve of hearing are usually very grave. There are a few diseases characterized by severe brain symptoms which are singularly obnoxious to this region, mainly through the extension of inflammation to the auditory nerve and its surroundings; cerebro-spinal meningitis is an example of such affections, often leaving complete and incurable deafness. The affections of this region are but little influenced by hygienic measures.

II. AFFECTIONS OF THE EAR FROM NERVOUS SYMPATHY.

Affections of the ear from sympathy of the nerves occur more frequently than from any other cause; they are characterized by the insid-

iousness of their approach, serious injury to the organ of hearing often taking place without being heralded by any symptom of warning. Generally, however, there are appreciable symptoms which attract the patient's attention, although they may not always at first seem to threaten the ear. Perhaps the most frequent precursor of these is taking cold.

Taking cold in the head.—In order to understand fully the significance of taking cold in the head through sympathy of the nerves, it would be well to explain the peculiar character of the parts involved.

The cavity of the nose, the region chiefly affected, enjoys an immense expanse of mucous surface, far greater in extent than the modest external aspect of the organ would indicate; thus, where the cavity of the nose expands into the throat behind, its passages are greatly convoluted and an extensive and tortuous cavern is thus constituted. This posterior and much expanded portion of the nasal cavity is covered by a highly vascular mucous membrane—the Schneiderian membrane—which is easily irritated, either by the entrance of particles of dust or by the reflex irritation to be described below. At the beginning of a cold in the head the blood vessels of this membrane become engorged, when the flow of mucus, which is naturally secreted in moderate quantities, is usually very much increased. The phenomena of a nasal catarrh are now soon manifest.

The *modus operandi* of taking cold in the head through sympathy of the nerves should be fully comprehended if we would wish to prevent aural disease by means of hygienic measures. In order to clear the way to an explanation it may be permitted to draw attention to some familiar phenomena which are due to the reflex action of the nerves or nervous sympathy; thus, certain individuals are known to be subject to flushing from slight causes, in explanation of which it may be said that a shock has been experienced from a mental impression which serves to paralyze the nerves controlling the blood supply about the head; the face is then instantly flushed, and in extreme cases dryness of the throat is experienced, and the head becomes hot from the sudden rush of blood into the arteries. The paralyzing effect is usually of temporary duration, the nerves regain their normal power, and the flushing and other symptoms are no longer experienced. In the more decided cases, however, pallor and dizziness succeed to the rush of blood. Another example suggests itself in the earache of dental irritation; pains in the ears are thus experienced in some instances from the cutting of a tooth or from dental decay, even without any irritation being felt in the mouth.

A cold in the head may arise from an exposure during which a current of cold air is allowed to fall upon the unprotected head and shoulders; the local shock from the draught of cold air is usually too mild to be observed by the person who has been thus exposed, but the nearest nerve centres which are concerned in the reflex action, and which are connected

with the spinal cord, have branches distributed to the exposed regions of the head and neck; they also maintain, by other small branches, communication with the mucous membrane in the nose and influence the blood supply in the latter region. In health the tone of the arteries is maintained by these nerves, which are called "sympathetic," but the shock occasioned by the draught of cold air serves to impair their functions and they become immediately paralyzed. This temporary paralysis of the nerves is promptly followed by an expansion of the blood vessels in the mucous membrane of the nose, when congestion ensues and the mucous secretion is increased. The result of an exposure to cold draughts is not invariably a cold in the head—a "stiff neck" may ensue.

During the existence of most head colds the ears are exceedingly liable to be involved; thus, the Eustachian tubes may be obstructed by the swelling of their mucous membranes, when the usual air supply of the drum cavity will be cut off; or, the catarrhal inflammation may extend from the throat up the Eustachian tubes and thence into the drum cavity. Both of these conditions usually coexist and give rise to much deafness.

But the ear may be affected without this catarrhal extension through the Eustachian tube. Thus, an independent inflammation may arise in the ears through the nervous sympathy existing between them, the throat, or nose.

In a certain number of instances the effect of taking cold may be manifested in the ear alone, the naso-pharynx escaping entirely. The aural complication is announced by a "stuffy" feeling in the ears; there are noises and autophony experienced and more or less deafness. (See pages 28, 29.)

Dental irritation.—By referring back to the *modus operandi* of taking cold, it will be readily understood how any dental irritation may give rise to aural disturbances, for the nervous relationship between the teeth and the ears is most intimate. In this manner many affections of the ear which were formerly attributed to other influences may now be accounted for.¹ The reflected neuralgias from dental caries are quite familiar to most readers, but it frequently happens that, through the nervous influence referred to, a morbid action is set up in the ears, and continues almost indefinitely without being attended with any marked pain in either the teeth or the ears, and therefore without attracting the patient's attention. But in a great many instances pain, either in the teeth or ears or in both, is a prominent symptom. The *modus operandi* of these sympathetic aural troubles is well illustrated in the accompanying diagram,² which shows the nervous connection between a carious tooth and the drum-head. The drum-head, it will be seen, is in part supplied by a small artery (indicated at 8 in the figure on page

¹ See the author's prize essay "On affections of the ear arising from diseases of the teeth," *Am. Jour. Med. Sciences*, Jan., 1880.

² *The diagram is from Woakes; see his work on deafness, giddiness, and noises in the head.* Presley Blakiston, Philadelphia, 1880.

15), which is under the influence of the vaso-motor (sympathetic) nerves of the carotid plexus, which at this part come largely from the otic ganglion (4). From the source of irritation in the carious tooth a nerve (7) also communicates with the same ganglion (4). A line of nerve communication is now established, through the otic ganglion, between the teeth and vascular supply of the drum-head. The effect of irritation in the teeth or gums will be to excite vessel dilatation in the arteries supplying the drum-head, when hyperæmia or even inflammation will result. This, of course, is only an illustration of an injury to a small portion of the organ; sometimes the drum cavity is thus affected, and when the sympathetic influence is characterized by chronicity, trophic changes may go slowly on, causing great injury to the ear without exciting any attention until hearing is seriously impaired.

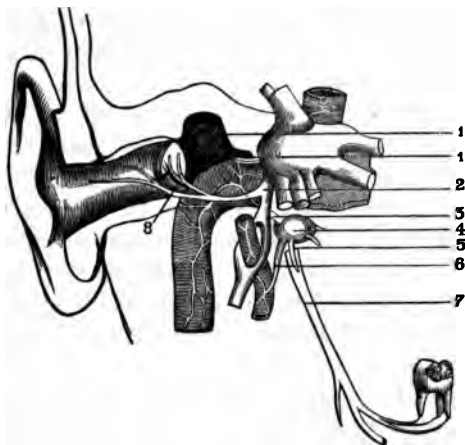


FIGURE 5.

With this brief explanation of the reflex phenomena concerned in aural diseases from dental irritation, I shall give some account of the dental disturbances that more particularly affect children.

The *first set of teeth*, which are all cut before the third year, are liable in some children to erupt with difficulty; it is a well known fact that with the cutting of nearly every one of these teeth the ears may be painful or a discharge may occur.

The *permanent teeth* begin to erupt at about the sixth year, and from this time on to the twelfth year, when the process is about completed, the strength of the child is severely tested; during this period of time nature makes an effort to gradually shed the temporary teeth and replace them by the permanent set. When the temporary teeth are shed in the natural way the process occasions but little irritation; but the crowns of these teeth are extremely liable to decay before being shed, when, the nerve being exposed, pains and local irritation are experienced.

The wisdom teeth.—These usually erupt about the eighteenth year. In many instances, however, their appearance is delayed, and they come in with difficulty, causing great aural irritation.

Among the consequences of dental irritation on the ears may be mentioned the increase of wax secreted, the occurrence of boils in the auditory canal, and injurious influences on the drum. The importance of this subject will demand a more particular account of dental disturbances further on.

THE EFFECTS OF GETTING WATER IN THE EARS.

When cold water gains admission to the ears the effect is usually unpleasant, often injurious. Inflammation of the auditory canal, at its delicate inner extremity especially, is a frequent result of getting sea water into this passage. But the drum-head, being yet more delicate, is more liable to become inflamed from this cause. The inflammation seldom is confined to the drum-head, but very soon involves the entire drum cavity.

The force of the waves in *surf bathing* may send the water into the auditory canal with sufficient violence to rupture the drum-head; or, if the wave strikes the bather on the face, water may be thus driven through the mouth and nose into the Eustachian tubes, by which route the drum cavity may be reached. (See Fig. 1, page 7.)

Diving and swimming under water, especially when long continued, are even more dangerous than bathing in the surf; the cold and irritating salt water, when thus long retained in the auditory canal, is very liable to cause inflammation; and should strangling occur, water is then freely admitted into the mouth and nose, the gasping and sneezing efforts to get rid of which are very often sufficiently forcible to send it into the drum. The injuriousness of sea water is owing to its comparatively low temperature and the large quantity of salt that it holds in solution. Prolonged bathing, however, in the waters of brook or pond, is not advisable, neither should the body be exposed to currents of air after coming out of the water. Besides being intensely painful in most instances, these injuries to the ear always cause temporary impairment of hearing; and irreparable deafness, together with chronic discharges, is liable to remain as a permanent legacy. (See page 34.)

The nasal douche.—The use of this apparatus, now unfortunately well established in domestic practice, is exceedingly liable to injure the ears by the transmission of the fluid used to the drum cavity; its employment, therefore, is unadvisable.

Sniffing water or remedies in solution up the nose is not free from the same danger that attends the use of the nasal douche; it should never be practised, therefore, without the advice of some one competent to prescribe the proper mode of procedure.

OTHER CAUSES OF DEAFNESS.

Children's diseases.—Many of the diseases of childhood are well known to leave persistent sequelæ in their wake, not the least offensive of which are aural discharges. Scarlet fever takes the first place in the ranks of these scourges; but measles, diphtheria, cerebro-spinal meningitis, whooping cough, and sometimes mumps are likewise inimical to the hearing sense, their liability to affect the hearing being somewhat in the order of the above enumeration.

Cutting the hair.—Closely cropping the hair of the head, especially its removal from the parts immediately back of the ears, has been observed

to be sometimes followed by inflammation of the organ of hearing. Hair cutting should not, therefore, be thoughtlessly done.

INCAPACITATING DEAFNESS.

Having now given the principal causes of deafness, I shall endeavor to define the different degrees of aural disability which incapacitate the pupil, to a greater or less extent, from receiving instruction in the ordinary manner, in order that it may be ascertained what special means of instruction might be necessary. Before proceeding further, however, it would be well to define what constitutes good hearing, in order that we may have some standard from which a departure may be taken.

Normal hearing may be said, then, to consist in the mental perception of sound that has been transmitted through the unimpaired medium of both ears. Without binaural hearing the acquisition of knowledge by the ordinary methods of instruction becomes difficult proportionately to the degree of aural impairment. Hearing with both ears thus enables the pupil to quickly determine the direction from which sound proceeds, and it also enables him to promptly recognize the finer shading in the pronunciation of words. When, therefore, a pupil is observed to be backward in his studies, the teacher should, before attributing his want of success to mental defects, inquire if he hears well. It would be by no means a wise procedure to classify every departure from the normal standard among those who require particular care on account of their defectiveness, for a pupil may progress very fairly in his studies when the hearing of only one ear remains or when he has very considerable defects in both ears; yet such pupils will be very much aided by the recognition of their disabilities.

Incapacitating deafness.—All degrees of deafness may be said to impair the learning capacity of a pupil, but in establishing a standard of impairment which shall consign a pupil to exclusion from his better hearing fellows for instruction, I would select for special methods those who are unable to understand what is said to them in the ordinary tone of voice when five feet away from the speaker. Such a rule, however, must necessarily be applied with discrimination; must be, in other words, a flexible standard, for some defective, but well advanced, pupils, by reason of their natural quickness, will, without being a hindrance, do much better when subjected to the emulative influences of good hearing children. The disposition in the school room of those who have been designated as likely to make better progress under ordinary methods will be considered later on; but for the delicate task of selecting the more defective children from these, I shall now venture to lay down some rules which I trust will serve to aid the teacher until better ones shall have been devised.

METHOD OF TESTING THE HEARING POWER OF PUPILS.

It would be well were it a requirement that the pupils of the public schools should be examined at the beginning of each session with a

view to ascertain what number were too deaf to receive instruction in the ordinary manner and what number, having slight defects, would get on better if seated properly in the school room.

In conducting examinations it will be found that the voice of the person with which the children are familiar in learning is the best test, and, indeed, it is the only sound that need be used; sounds like the ticking of a watch, for example, need not be employed, as the ability to hear them is not significant as regards the pupil's hearing power for sounds used in teaching.¹

The sentences selected for tests should be intelligible to the understanding of the pupil, and some of the words ought to contain the hissing sounds, others the guttural, as "m," "n," "g," as these are heard with the greatest difficulty when hearing is impaired. Unless the sentences made use of are frequently changed, the pupils may become familiar with some of them and thus comprehend their import without hearing them distinctly.

During the examination the pupil should be placed about twelve feet from the examiner and should close his eyes; an assistant may then stop one of the pupil's ears by the pressure of his finger while the other is being tested. The examiner can now ascertain the hearing power by raising or lowering his voice as required.

In every instance where the sense of hearing is found to be defective, some record of the fact would be found serviceable for future use. It may be well to remark in this connection that the acoustic qualities of the room in which an examination is held should be taken into account—whether it be a large or a small room, whether containing many persons, draperies, &c., or comparatively empty, and, finally, whether any open doors or windows admit sounds from without. The age and the mental development of the pupil are also factors of importance, an uncultivated mind being slow in comprehension.

Examinations of the pupils in the public and parochial schools.—The writer's own observations in private and hospital practice having led him to believe that a large number of children with impaired hearing were in constant attendance at school without due attention being given to the disadvantages under which they were placed, he concluded to institute some examinations of the pupils in the public and parochial schools of New York with the view of ascertaining the percentage of deafness and the state of aural hygiene among them.²

¹ The difficulties in the way of establishing a uniform standard for the voice test are well nigh insurmountable, inasmuch as no two persons possess voices of equal quality; it is thought best, therefore, for the teacher of each class to examine his own pupils, employing for this purpose the tone of voice usual in teaching.

² The author gladly acknowledges the courtesy and kind assistance in his visitations of the superintendents and teachers in the Roman Catholic parochial and in the colored public schools; his efforts in other departments of the public schools were not so successful, and the absence of encouragement in this direction by those who should be interested will serve to account for the small number examined.

Being aware of the fact that deafness existed in numerous cases where an examination only would convince the patient of the fact, the writer in conducting the school examinations first interrogated both the teachers and the pupils as to their own knowledge of any deafness; their replies and the subsequent lack of verification are significant. It should be stated that these examinations were made under circumstances unfavorable to the attainment of such results as would be required for an exact classification of pupils, for at the visitations the children were found at their recitations or when they were on the eve of dismissal. But the results obtained are thought not to be without value. For his general conclusions on this subject, however, the writer has relied on the thorough examinations made of individual cases which have been brought to him for treatment; in these the tests of the hearing power were made deliberately, and the statements of parents regarding the cases were also obtained.

Remarks on the examinations of pupils in the public and parochial schools.—Five hundred and seventy pupils were examined; they were distributed as follows:

In the colored public schools.....	261
In the Roman Catholic parochial schools.....	226
In the white public schools.....	83

570

An analytical view of the details of these examinations as exhibited in the tables¹ shows that of the five hundred and seventy pupils examined the teachers were previously aware of the existence of one case of deafness only, while the pupils themselves were but little better informed, only nineteen of the entire number being aware of their aural defects. In my own examinations, which were by no means searching and in which the teachers usually gave the test questions with the intent of compelling the children to hear them, I detected seventy-six cases, or about 13 per cent., of greatly diminished hearing in one or both ears.

Four hundred and eighty-seven of the entire number of the pupils were asked if they had ever experienced *earaches*; one hundred and seventy-three of them, or about 36 per cent., recollected having had this symptom. Among the older children but few had any recollection of ever having had pains in the ears, probably because past pains are soon forgotten. In all of these instances where earaches had been experienced it may be inferred that the aural affection that gave rise to them had also more or less permanently damaged the sense of hearing; but such defects would not be apparent unless more delicate tests were made.

ANOMALIES OF HEARING.

There are some peculiarities in hearing experienced when the ears have never been diseased which cannot be strictly included in any of

¹The details of these examinations may be consulted in these tables appended at the end of the paper.

the subjects previously considered; among these is the ability of some individuals to hear most acutely certain sounds while they hear others very badly: thus, a person may hear the low rumbling of the thunder attending sheet lightning, a sound quite inaudible to many, while the chirping of a cricket, which is painfully acute to some, he will not hear at all. I have no doubt that experiences quite the contrary of this may exist, but as yet I have been unable to confirm the opinion by observation; in certain diseased conditions of the ear, however, examples are not wanting where persons hear the ticking of a watch, which is a high sound, quite well, but who hear conversation in a low tone of voice with difficulty. On the other hand, the relatively good hearing for low sounds of the voice is sometimes a condition in aural affections.¹

*Autophony.*²—Autophony occurs during the progress of most aural diseases. It consists in hearing one's own voice in the head; it sometimes amounts to simply this, but there is often heard a reverberation of the voice, or an "echo" as it is often styled, and it is then described by the sufferer as double hearing. When the patient thus hears his own voice he fancies that others cannot hear him talk, for the voice seems to go up into the affected ear instead of going out of the mouth. The effort of talking becomes very tiresome to him, for no exertion, however great, is of any avail; the louder he tries to speak the more disagreeable his voice sounds in his own ear.

The autophonous voice sounds very strange to the patient; it is unlike his own voice; it seems as though another person, at a distance, were speaking. When the voice is thus heard false by the pupil, he is unable to regulate or control it, for at one moment it may sound quite naturally, as though in fact it came out of his mouth and went around to the ear as usual, while the next moment it seems to fail of utterance altogether and reaches the ear from within the head.

In false hearing the voice usually appears to be hoarse, the patient often calling one's attention to this with the remark that he must have caught cold. Sometimes the voice, however, seems to the sufferer to be very high in pitch. When hearing it higher than it should be, the patient makes an unsuccessful effort to correct the fault by lowering his voice, often to a whisper; when it seems "hoarse" and low the attempt to correct the apparent defect results in an unpleasantly loud voice.³ During the continuance of this trouble confusing noises in the head are also experienced; they are but little less annoying than false hearing. This symptom is often of brief duration, but in a large number of cases it becomes permanent.⁴

¹The number of persons who (without aural disease) possess these peculiarities is comparatively few, as far as is known, but as attention is directed to these conditions it is probable that the number will be found to be considerable.

²See note at the foot of page 11.

³This will explain why some deaf people shout their words to those whom they know to have good hearing.

⁴Allusion has not been made to the effect of false hearing on those who use the singing voice; it may be said that while the hearing is thus affected the voice cannot be

The autophonous voice sounds so alarming to children that they frequently avoid speaking altogether; when silence is thus maintained the child is called "dumb." It has been my experience to have many patients of this kind brought to the infirmary by their parents, and it has not infrequently come out at the examination that such patients have been severely punished for supposed stupidity. This condition of the hearing organ is by no means of infrequent occurrence, and the teacher should consider its possible influence on a child's behavior before condemning it as perverse or wilfully disobedient.

Noises in the head are almost inseparable from all kinds of aural affections; they manifest themselves in an infinite variety of phases, almost every patient describing his own experience differently; they are thus said to resemble ringing of bells, the roar of the sea, or of the wind among the trees, the buzzing of insects, the escape of steam, &c. To some these noises seem so loud that rest cannot be obtained. They must be very confusing to children who experience them in some degree with almost every cold in the head, and where long neglected running from the ear exists the distress from tinnitus must often be very great indeed.

The above by no means presents in their strongest light the troubles that children experience when the sense of hearing is perverted; it may, however, serve to show that they are subject to some very distressing symptoms without always being able to make their sufferings known, such facts, in my own experience, only being elicited from the uninformed and apprehensive patient by the most painstaking examination.

IMPERFECTIONS IN SPEECH.

Attention will now be given to another kind of difficulty—in its way no less vexatious than the disabling affections already mentioned—an ailment existing very often altogether independently of aural disease yet having its origin in the same etiological causes: I allude to anomalies of vocalization. Although these anomalies usually coexist with defects in hearing, their differentiation is important in the management of backward children, for the subject may otherwise be relegated to the class of feeble-minded youth who are considered as but little removed from the demented.

The acquisition of language may be said to consist in correctly hearing the words and sentences of which language is composed and in the persistent repetition of the same until memorized. Children, therefore, require good ears and long practice in the imitation of the voice of their instructors before they become masters of spoken language. It should be kept in mind here that a slight degree of deafness may be sufficient to hinder the child in the first steps that he takes in learning to talk—and these first steps are, probably, much more immature than they are

trained to singing, nor can the pupil so affected be taught to perform on musical instruments. For an account of false hearing, in this connection, see the author's paper "On false hearing and autophony in singers, speakers, and performers on certain musical instruments," in the *New York Medical Record*, January 22, 1881.

usually thought to be, as the infant is at first, probably, unconscious of most sounds, the perceptive faculties of the ear not being taxed beyond the requirements of the mental faculties.

It is very difficult to discover defectiveness in hearing before the child is one year old; owing to this fact the child may be "stone deaf" for a considerable time before the discovery is made. Even a slight defect in hearing is a detriment to the infant, for his education begins as soon as the slightest attention to sound is given.

The child, in this process of acquiring knowledge, repeats words as they are heard; if it hears them incorrectly a faulty enunciation is acquired; thus every one has observed in his own experience how unintelligible the language of partially deaf children is, how slow they are in learning to talk. The flexibility of the voice is naturally very great, and uninterrupted practice increases its fluency from day to day; the young learner, relying on his imitative faculties rather than his own judgment, readily adopts the accent of his teachers and associates, and in this manner he acquires the dialect of the locality in which he lives.

The correct enunciation of words depends very much on a healthy condition of the upper vocal organs—the mouth, nose, and pharynx—and on the unobstructed passage of air through them during vocalization. Repeated attacks of head colds, resulting in nasal catarrh, enlargement of the tonsils, &c., together with irregularities of the teeth, are the principal etiological factors in the development of impediments that interfere with the physiological functions of these parts. A nasal tone of voice is an almost invariable characteristic of these impediments, but very often the obstructions in the throat or nose are so great as to give a "choked" expression to the voice. Enunciation then is difficult; for example, letters which require for their pronunciation the use of some of these parts, as "m" and "n," cannot be correctly enunciated. When defects in speech arise from disease in both the ear and throat the pupil is placed at a very great disadvantage indeed as regards the learning of correct enunciation; he fails to hear certain words, and on the other hand there are certain others which he is unable to enunciate. Thus, the hissing sound of the voice may not be heard at all; the pupil is therefore liable to leave it out of his speech entirely; for example, he will pronounce sir as "thir" and sausage as "thausig," and so on. Should the deafness be very great, the person will omit such sounds entirely; not that he is physically unable to make them, but he does not know how they sound. Now, should the pupil possess obstructions in the nose and throat as well as defective hearing, instruction under existing methods will be difficult—in some instances well nigh impossible.

The voice, it should be stated in this connection, becomes very much modified after the individual ceases to hear well; it loses its flexibility and can no longer be modulated.

MANAGEMENT OF PUPILS WITH IMPAIRED HEARING.

The *separate education* of pupils whose impaired sense of hearing debars them from the benefits of education by ordinary methods, from the investigation that has been made concerning their capacity to acquire knowledge, would seem to be a necessity. The claims of the deaf-mute have been long since recognized, and his wants in great measure provided for; it remains now to recommend measures for a neglected class of equal numbers whose requirements are no less urgent.

I shall not, in this connection, essay to suggest any matured scheme for the special instruction of those who are not entirely beyond the reach of vocal methods, but who are yet too deaf to be taught with good hearing pupils without interfering with their instruction: the attempt would carry me beyond the scope of this paper. Such a scheme will require for its successful development the time and labor of experienced teachers, and even under the most favorable circumstances the progress of any plan will necessarily be slow. I shall, however, venture to offer some suggestions in the matter, hoping that, inasmuch as my views have been derived from a very considerable experience in the observation of aural defects, the advice given from an otologist's standpoint may not be without value.

We will suppose that steps have been already taken to ascertain the hearing power of the pupils; the next step will be the classification of such as have been found to be defective.

Disposition of deaf pupils.—Any pupil found to hear the ordinary voice of the teacher with difficulty should occupy a seat near him.

When hearing is good in one ear only, the child will hear to the best advantage if seated rather to one side, so that the good ear will be towards the teacher.

Pupils whose defective sense of hearing prevents them from receiving scarcely any instruction by the usual vocal method should be, if possible, separated from the good hearing and taught by special methods. As intimated before, children who cannot understand the teacher at the distance of five feet, when addressed in the ordinary tone of voice, are not only an obstruction to the work of teaching other pupils, but they can learn but little themselves. These pupils, in many instances, may perhaps remain very deaf only a short time; they may be entirely cured by treatment; special instruction would then, in these cases, be regarded as tentative only, for when improvement takes place their advancement will be more rapid among pupils whose hearing is good.

When it is found that children are too deaf to make any progress or from an increase of deafness it is unmistakably manifest that they cannot be instructed by vocal methods, they may be relegated to a department where deaf-mutes alone are taught.

Deaf-mutes.—When the acoustic organs are too greatly impaired for vocal instruction to be of any benefit, pupils are generally designated as deaf-mutes. This classification, however, is rather an arbitrary one, for

all persons who are unable to understand speech by means of the sense of hearing are by no means mutes, nor can all of them be instructed equally well. It would be well, therefore, for the purposes of instruction, to divide this class of persons into two groups: those who hear their own voice and those who do not.

Of the first named group it may be said that a certain number are congenitally defective, while others become deaf at a later period in childhood. Notwithstanding the profound deafness of these children to outward sounds, some of them are capable of learning to speak with greater or less distinctness, the perceptive functions of hearing having been preserved to a goodly extent while the transmitting mechanism has sustained irreparable impairment. To the greater number of these pupils the autophonous voice which remains to them is very far from imparting a natural impression of the voice to the mind; their vocalization is notable for its "muted" cadence, the words seeming to be uttered in imitation of the sounds transmitted to the perverted sense of hearing from their own vocal organs. A much better vocal power remains when children have previously learned to talk well than when speech has not been so acquired. Under no circumstances, however, will the voice remain unchanged; it is no longer flexible and pleasantly modulated, but soon becomes mechanical and harsh.

The second group of deaf-mutes includes those in whom there is an entire absence of the perceptive function of hearing, either congenitally or from the more severe diseases which deprive the auditory nerve of its functions. In some of these the transmitting mechanism of the middle ear may not be greatly impaired, but the nerve no longer perceives sensations of sound from any source, either without or within the head.

Of these, the congenitally deaf can never, I am inclined to believe, practicably be taught to speak very intelligibly, for they cannot hear any sound upon which the mind may form an idea as to the character of speech. They, however, who have once fairly acquired speech may retain the use of it in a very satisfactory degree after becoming deaf, if well trained. Very young children who have only just learned to talk soon lose the faculty, and it is very difficult for them to ever learn to speak well again.

In a certain number of cases of deaf-mutism both the middle and inner ear are undoubtedly affected by disease, but in the greater number of cases the disability seems to be mainly seated in one of these regions only. Where the functions of the nerve of audition have not been exercised, in consequence of early impairment of the mechanism on which transmission of sound to the inner ear depends, its deterioration will probably ensue. Owing to the neglect of a great many of these children at home, the difficulties in the way of their education are much increased. Although the number of pupils who will be found to hear their own voice fairly well is comparatively small, yet it would be well to differentiate *between these* and the pupils who do not, for the former possess capa-

bilities for learning which the latter do not enjoy; the one may acquire articulate speech, while the other may be advantageously taught the sign language only.

These children, in the larger cities, could in many instances be more economically taught if kept under home influences and educated in a special department of the public schools.

In the instruction of the very deaf and of those who hear no external sounds but yet hear their own voices, some assistance may be obtained by the employment of conversation tubes among the former and of the mouth trumpet and otacoustic fan among the latter. The mouth trumpet, which consists of a tube for speaking into the mouth, gives the pupil in some instances a more correct idea of the natural tone of the voice than any other aid to hearing. Dental sound transmission by means of a fan can also be made serviceable in certain cases, the speaker being obliged, however, in availing himself of its use, to place the pupil within one or two feet of his mouth while thus teaching. The use of these appliances, moreover, will aid the examiner in determining the pupil's hearing power for his (the pupil's) own voice.

It is hoped by the writer that what has been said above concerning the education of deaf-mutes may not be construed to reflect upon the usefulness of institutions that are more particularly asylums for the physical care of this class, and which not only provide temporarily a charitable home for them, but also give them an education at the same time.

DEAFNESS AMONG TEACHERS.

It is not unfair to state that teachers do not enjoy greater immunities from impairments of the sense of hearing than others in the same social position; and, although a certain degree of deafness should not exclude a person otherwise competent from the pedagogical profession, yet it must be confessed that good hearing is very essential to one who has so many experiences to try his temper and who should be able to avoid doing an injustice to any pupil from a failure to hear everything that is said in his presence. Should an instructor himself be defective in his hearing sense and yet be unaware of the fact, it would be easy for him to unjustly censure children for incompetency in the course of instruction or in examinations for promotion simply because their responses were not heard. The writer has known instances where teachers when suffering from temporary deafness were almost sure to hear certain words incorrectly, and were therefore obliged to ask pupils to repeat their replies over and over again before they could assure themselves of their correctness. Such experiences are a warning to those having irremediable defects.

Persons desirous of acquiring a pedagogical education at the public expense should be subjected to an aural examination before they are accepted; and in the appointment of teachers in the public schools the ability to hear well should be a requisite. If the examinations were al-

ways oral, the applicants being required to *hear* the questions, they would be more satisfactory than if otherwise conducted. I have in mind an illustrative case which is of interest in this connection : A young lady nineteen years old had been, it was supposed, thoroughly prepared for teaching in an excellent school for young ladies ; but, owing principally to dental irritation, she gradually became so deaf that when, after graduation, she appeared before a Brooklyn board of examiners for appointment as a teacher in the public schools, she utterly failed. The questions were given out orally, and she was unable to answer them because of her inability to hear them correctly. The board of examiners, however, was not aware of her aural defect. Had the same attention been given in the case of this young lady to the condition of the ears and teeth that was devoted to her mental improvement, her success would probably have been assured. When I saw her shortly after her failure it was found that her mouth was greatly deformed by irregular teeth, and that these together with a great amount of dental caries, had been the principal cause of the deafness ; the teeth had never received any attention, and from the irritation attributable to them and her inability to properly masticate her food the general health had also suffered.

AURAL HYGIENE IN THE SCHOOLS.

That we have a faulty system of school hygiene no one familiar with the facts will deny ; and the remark is equally true both as regards the construction of our public school-houses and the personal care of school children.

When we are appealed to as humanitarians to provide hospital accommodations for the pauper class, no means are spared in the planning and erection of healthful buildings for their use, but when school-houses are to be constructed — where both body and mind should be aided in development, prepared, I may say, to enter the struggle for “the survival of the fittest” — their erection is, I fear, too often intrusted to the political contractor, whose knowledge in building is chiefly confined to “making it pay.”

Let us hope, however, that time will correct these abuses, and in the mean time we must discuss what is best to be done with such buildings as have been given to us. These are not, perhaps, so faulty but that better hygienic regulations could contribute very much to their comfort and healthfulness.

It will, however, be useless to devise plans for the heating and ventilation of school-houses so long as negligence and apathy prevail on the part of those who have such matters in charge ; these seem to regard the heating of apartments occupied by school children as contributing sufficiently to their personal well-being. It is, no doubt, honestly believed by many to be more important to maintain a certain established temperature in the school room than to protect the individual from injudicious exposure to draughts or to an undue elevation of temperature, as

the case may be. There has been so much said about the ills that arise from breathing foul gas and dust, which are believed to poison the blood or irritate the air passages, and so little said about the dangers of draughts of air, that the latter are liable to be overlooked in the anxiety to avoid the evils attendant on the former. Too much care cannot be taken, obviously, to avoid the inhalation of deleterious matters, but certainly equal care should be exercised to guard against the injurious effects of air draughts to which pupils are so much exposed. It would be of much service in properly ventilating school rooms were open fire-places in more general use, and it is to be hoped that architects and sanitary engineers will insist on the introduction to these in the future. It may be well to say a word here as to the proper temperature of school rooms and the clothing of the pupils.

Temperature of the school room.—The temperature of the school room should be kept at about 68° or 70° Fahrenheit, as indicated by the thermometer; it should not be regulated by the sensitiveness of any individual, such a test being by no means reliable for this purpose. The necessity for the renewal of fresh air for ventilating purposes must be determined by the season of the year, the size of the room, and the number of pupils present; when the doors and windows are thrown open for this purpose, the children should be required to leave their seats and walk about in order to avoid any ill effects from draughts. Children should be protected, if possible, from exposure to currents of air after exercising; nor should they stand or sit while “cooling off,” but move about quietly and resume any wraps that have been laid aside. The air of halls or lecture rooms, especially when illuminated or crowded, soon becomes much vitiated, and, by depriving the system of its natural powers of resistance, favors the invasion of colds.

Insufficient clothing.—A large number of children present themselves at our public schools insufficiently clad, or come during inclement weather chilled from exposure; they are often obliged to sit in wet clothing, especially wet stockings and shoes. The parents of the poorer pupils will require their attendance at school under the most unfavorable conditions, that they may be for a time relieved of their care. To neglect the physical condition of this class would seem no less a culpable oversight than a disregard of intellectual training.

The excessively clad.—As regards another and entirely opposite class to the above, a greatly increased sensibility ensues from the use of too much clothing and the neglect of outdoor exercise; thus, children are often made exceedingly susceptible to colds by the use of superabundant wraps made of furs, which, in our climate, are at best suitable only for emergencies arising in exceptionably cold weather. It is a well known fact that among the more wealthy the constant use of seal-skin sacks and all kinds of fur collars, boas, &c., is the cause of unmanageable head colds; such colds, when unrelieved, are the means of establishing most persistent nasal catarrhs.

From what has been said above, it will be seen that our system of school hygienics is by no means perfect, and we may infer that the home sanitation of children is also deplorably faulty; when these shall have been corrected, much physical suffering will be prevented and many of the complaints under consideration avoided.

We have now to consider the consequences of these neglects on the acoustic organs, among the most important of which is taking cold in the head; to this is to be attributed a large proportion of children's auricular affections, and I shall, therefore, discuss the etiological factors concerned somewhat at length.

TAKING COLD IN THE HEAD.

Taking cold is an experience usually derived from unguarded exposures to draughts of cold air. When the weather moderates, colds are observed to be especially prevalent; the care ordinarily exercised for the body's protection is then neglected: warm wraps are laid aside, wet clothing is permitted to remain upon the person; and then, too, it is that rooms are liable to become overheated, and the dangerous draughts which are created by negligently leaving doors and windows open are not avoided with sufficient care. It is a well known fact that colds are not most prevalent in the coldest weather, but that, on the contrary, the persistently low temperature of our northerly climate is most invigorating; indeed, while the extreme cold holds on, catarrhs are conspicuous by their absence. It is worthy of mention, in confirmation of the above, that the inhabitants of our South Atlantic and Gulf States by no means enjoy an entire immunity from colds and their consequences. Although their winters are exceedingly mild, the thermal vicissitudes are even more trying than at the North, and catarrhal troubles are therefore not unusual.

The modus operandi of taking cold having been already explained (see pages 13-14), it now remains to account for the prevalence of catarrhal affections among school children, in order that hygienic measures may be inaugurated for their prevention. It has been asserted above that nervous sympathetic action, whereby widely separated parts are brought into intimate relationship with each other, is to be dreaded because of its insidiousness; thus, following an exposure whereby a cold in the head is established, the irritation in the nasal region is not, as may be supposed, owing to the cold air inhaled, but to the reflex action of the nerves. A supposititious but exceedingly familiar example will serve to illustrate this proposition: A current of cold air—it may only be comparatively cold, from the cooling effect it has by hastening evaporation of the moisture upon the skin—is wafted in through an open window and allowed to fan the head and shoulders of a child who has become heated by the exercise of play or in hurrying to school; the exposed parts, the head and shoulders in this instance, receive a shock the local effect of which is usually slight, but through the agency of the sympathetic

nerves a more decided impression is made upon the mucous membrane of the nose. This may be announced by an attack of sneezing, more or less violent. Wet feet and clothing are also prolific sources of colds, both in the head and elsewhere.

Slight colds in the head are even more serious in their consequences than the effects of severe attacks with long intervals of immunity. When fresh attacks are almost daily experienced, the patient is for the most part absolutely indifferent because profoundly ignorant of any danger. Frequent recurrences, moreover, seem to establish eventually a susceptibility to these invasions, and when, finally, a chronic nasal catarrh is established the parents are greatly surprised to learn that, although complaints may have been confined to the state of the hearing organs, a most intractable nasal affection has been established. Nasal catarrh is sometimes an affection of the very earliest period in life, some infants, in fact, having evidences of it at birth. The affection is nearly always to be recognized by the flow of mucus from the nose, which gives rise to constant snuffling, and sometimes excoriates the nostrils and the upper lip; in older children attempts are made to hawk the secretion up into the mouth, as it otherwise has a tendency to drop down into the throat, where its presence causes irritation.

The general health of these sufferers is, of course, always more or less affected, for no organ of the body can be considered entirely independent of the others. Owing to the immediate connection through the Eustachian tubes, which are lined with mucous membrane which is continuous with that of the nose and pharynx, and also by means of the intimate nervous relationship, no organ probably suffers more from the consequences of colds in the head than the ear. Although these sufferers may have aches and pains in every region of the head, the importance of which the writer would by no means wish to exclude from due attention, yet he believes that the aural aspect of the subject is of sufficient consequence to justify him in drawing the attention of teachers especially to it; and, although they may not entirely prevent the occurrence of the colds which thoughtless pupils subject themselves to by exposures, yet they can do much in this direction with the means at their command, if not unmindful of their share of the responsibilities devolving on all of us who assume to aid in the work of bringing forward the youth of our race. (See page 13.)

DENTAL IRRITATION AND THE CARE OF THE TEETH.¹

The irritation of decayed teeth or inflamed gums is not only a frequent cause of aural disease of an acute nature, but very often it happens that when the ear is in a moderate state of irritation from sympathy with the teeth a cold or other cause will be much more liable to set up acute aural inflammation. From the present writer's own experience for some years he believes that diseases of the ear arising from

¹ The author is indebted to Dr. Frank Abbott, of New York, an authority in dental surgery, for valuable suggestions on this subject.

affections of the teeth are more frequent than has been urged by writers on the subject;¹ he feels, therefore, that the very considerable space which he shall devote to the matter will not be greater than its importance demands.

The teeth of some infants require very early the physician's and dentist's care, their eruption and development being so unhealthy that by much care only can trouble be obviated.

The *temporary teeth*, then, will first demand attention. The popular belief is that it is of no consequence when these teeth decay or are extracted, inasmuch as the permanent set will soon restore the loss. The evils resulting from the neglect that is based on this fallacy are very great. The temporary teeth, aside from their usefulness in the mastication of food, are the necessary pioneers of the second or permanent set; they should, therefore, be carefully preserved, not only from the injury likely to ensue from biting very hard substances, such as nuts and the like, but also from the deleterious influences of uncleanness. If the decay in a temporary tooth is not treated and then filled properly before the nerve pulp is destroyed, the roots are not absorbed as they should be, and hence they are in the way of the coming permanent teeth and divert them from their proper course; in most instances there is also much irritation from the crowding that ensues (see 1, 1, Figure 7, page 32). Sometimes these temporary teeth, with their unabsorbed fangs, are crowded partly out by the permanent teeth, but remain in the gum by the sides of the new teeth; should their fangs be sharp, much irritation is caused by wounds of the cheeks or tongue, and their presence in the gum is a sufficient source of irritation to set up aural hyperæmia.

The regularity and healthfulness of the permanent teeth depend very much on the treatment of the first set; especially is the much too general practice of extracting the temporary teeth, because they are believed to be of little service, to be deprecated. Just here a word of caution is required concerning the appearance of the first teeth of the permanent set, namely, the six-year molars.

The *six-year or first molar teeth* are four in number. These teeth, on account of their imperfect state, are believed to be less able to withstand the influences that lead to caries than those of the permanent set which are cut later, and they are, therefore, liable to decay early. Even when parents find them decayed they are generally neglected, although sometimes exceedingly painful, for they are usually supposed to be temporary teeth, and hence not worth preservation. They should, if possible, be preserved. Another dental epoch sometimes has an importance to the aurist on account of the great amount of irritation that may exist without the cause being suspected. I allude to the eruption of the third molar or wisdom teeth.

The wisdom teeth.—These teeth should erupt at about the eighteenth

¹ Dr. Charles H. Burnett was among the first to call attention to the nervous connection between the teeth and the ears. *Treatise on the Ear*. Philadelphia, 1877.

year, but they often come at a much later period and erupt with great difficulty. They are especially liable, in the lower jaw, to push against the adjacent tooth, and, being urged onward in the process of erupting, cause very great irritation. Some of the most intractable affections of the ear become established in this manner before the cause has been discovered.

I have long been in the habit of examining the teeth of children brought to me with aural diseases, and it happens very often that unsuspected dental irritation is found to coexist, to which the aural irritation is in some measure attributable. Among the large number of cases of school children who attend the aural clinics at the infirmary it is rare to find one where dental irritation should not be considered as a causative factor.

The teeth of children should be frequently examined at home, and any suspicious spots should not be neglected. It is a noteworthy fact that during the period of active dentition the nervousness of children is marked and the susceptibility to reflex phenomena is increased.

Disease of the teeth in the schools.—My attention, as above stated, having been drawn to the frequency of dental caries in connection with aural affections, I was led to make a thorough examination of the teeth of a considerable number of pupils in actual attendance at a public school in order to obtain a knowledge of their exact condition.¹ The number of such pupils examined was eighty; they consisted of such children as happened to be present in a number of class rooms, the attendance being small, as is usual in midsummer. It was found that scarcely any of the children were free from dental irritation, and few of them had teeth in a normal condition. In thirty of the number the teeth were in such

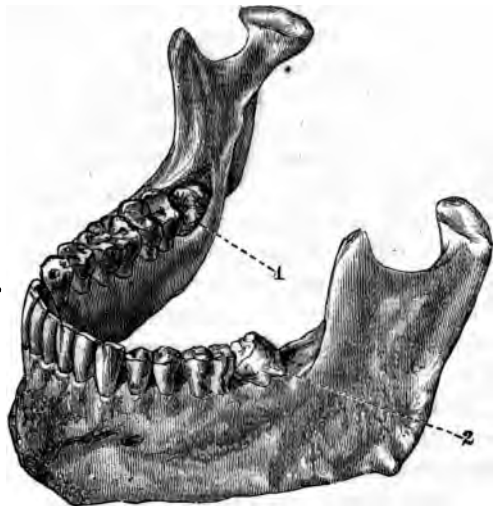


FIGURE 6.—Lower jaw or inferior maxilla, from a specimen in the author's cabinet. The figure shows the horizontal position of the lower wisdom teeth, the position which gives rise to their difficult eruption. 1. The right wisdom tooth, which is wedged in between the ramus, or upright portion of the jaw, and the second molar tooth; it has not, as yet, been able to leave its socket and cut through the gum. As the tooth is urged onward in the effort to erupt, it is forced against the sensitive root of the neighboring tooth, the pressure giving rise to much irritation. 2. The fully erupted left wisdom tooth; it is inclined toward the first molar; the second molar on this side having been lost, room was afforded this tooth to cut through the gum. The disturbance caused by these teeth is sometimes very great; the parts are not only subject to great swelling, but the suffering is often of a severe character. When mastication is attempted, the gum over the tooth is liable to be bruised and thus increase the irritation. Sometimes the irritation goes on for years, until nature seems to exhaust her expulsive forces, without completing the process of eruption; pains may or may not be experienced; sometimes they seem to shoot from the tooth to the ear. Through nervous sympathy the ears are very often affected. The two upper wisdom teeth usually erupt a short interval after the two lower and are cut with less difficulty.

¹ These children were nearly all of German parentage.

an unhealthy state, from irregularities and decay, that wax impressions were taken of them; these have since been mounted up in plaster for study. The deplorable neglect of the teeth among these children was a surprise to me, although, from previous observations, I had expected to find them very bad indeed. It was notable that teachers having charge of these pupils never suspected that the teeth ever gave rise to any serious trouble, but it was ascertained by questioning the children

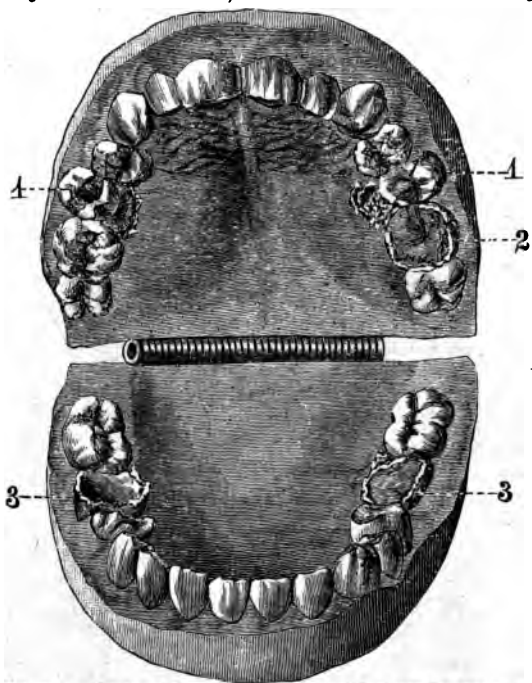


FIGURE 7.—Casts of the teeth of a school girl twelve years of age; from the author's cabinet; the casts are represented as being held together by a hinge. 1, 1. The second bicuspid teeth of the upper jaw, both of which have been crowded out of place as they erupted by the remains of the fangs of the temporary second molar teeth; these fangs, which have been too long retained in the gums, are seen in the cut just inside the second bicuspid. The retention of the fangs, together with the crowded and irregular condition of the permanent teeth which have just been cut, gave rise to much irritation. This anomalous condition of the teeth is by no means an unusual occurrence where the teeth are neglected. 2. The left upper six-year molar tooth, which is very carious. 3, 3. The two lower six-year molars, both of which have been destroyed by caries. The little girl from whose teeth these casts were taken suffered from deafness and frequent attacks of pain in both ears, and, as she herself expressed it, "the decayed teeth had ached very much all around."

that mastication of food was well-nigh impossible, for the pulps were exposed in nearly every one of them and the pressure of solid food on the pulps gave rise to so much pain that the food was bolted down hastily. The dental nervous filaments being in a state of constant irritation, not only gave rise to neuralgias of the head, but the whole system also sympathized. The food was retained about the jagged remains of the teeth, and, becoming decomposed, was taken into the stomach along with the purulent matter from the diseased gums; thus, contaminated by the

themselves that in nearly every instance they had experienced pains in the teeth or ears, sometimes in both. The appearance of many of these children indicated that the general health had not escaped the consequences of imperfectly masticated food; that some of them also suffered from neuralgias about the face and head "goes without saying."

The casts of the upper and lower teeth, shown in the cut (Fig. 7), represent one of the cases seen; it is by no means an exceptionally unfavorable example.

The cast shown in Figure 8 represents another case. This person always had trouble with his teeth; they ached severely in childhood while he was at school, and he has had brief periods of immunity only since that time. His teeth were in so bad a state

secretions of the mouth and imperfectly masticated, it caused an aggravated form of dyspepsia before the patient was sixteen years old. This person, when he came to the New York Eye and Ear Infirmary, where he was first seen, was found to be very deaf in both ears, and the right one was the seat of a very painful inflammatory affection; he complained of being very weak, and his appearance was that of a person who had become prematurely old. His face was pale, the cheeks having dirty-brown patches, from which the outer coating of the skin could easily be rubbed off. His eyes were weak, and a discharge from them had to be constantly wiped away. In regard to the teeth in this case it may be said that the patient never knew what it was to possess the use of them in a normal condition, for all of the back teeth of the second set probably came into the mouth in an imperfect state (deficient in enamel) and were therefore easily destroyed by disease, while the front teeth decayed from neglect to keep them clean.

In Figure 9 are represented the teeth of a boy who was born and brought up in England, where such deformities are, I believe, more frequent than on this side of the water. This person came to the New York Eye and Ear Infirmary in 1880 on account of his deafness, which had been very great in both ears ever since he was eleven years old; he

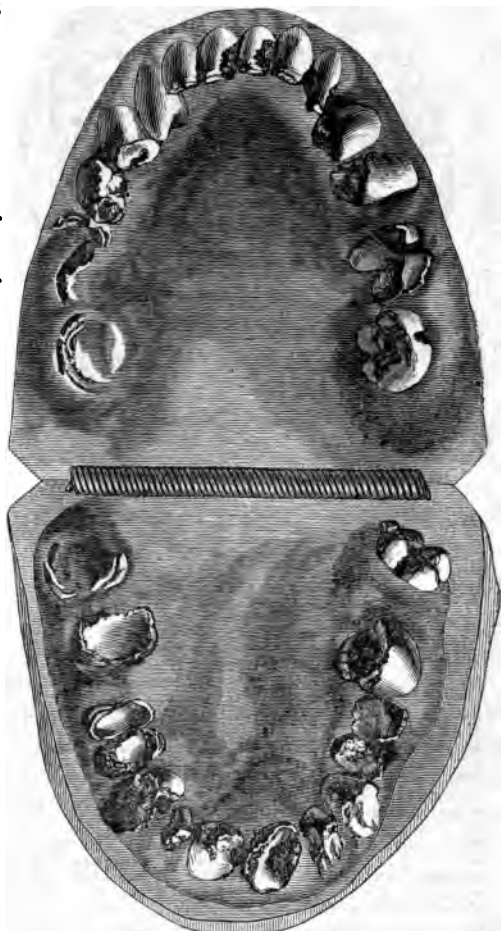


FIGURE 8.—View of plaster casts of the upper and lower teeth (Cabinet No. 14) of a youth aged twenty-two years.

can hear the voice only when spoken in a loud tone, which makes it difficult for him to perform his duties as cabin boy on board ship. The ears never ran, but he began to acquire his deafness during the period of his schoolboy days, at which time he experienced much toothache, and he still suffers from the pains occasioned by the decay of the second teeth. His tonsils are greatly enlarged, which, together with deformity of the teeth, preventing

closure of the mouth, has been the cause of habitual mouth breathing; such breathing prevents the normal development of the ear from taking place, and the irritation produced by the crowded and diseased teeth gives rise to aural inflammation.

It will be seen, by referring to the cut, that a very extraordinary deformity exists, namely, the articulation of the teeth is reversed, the under teeth shutting outside of the upper teeth all around the jaw.

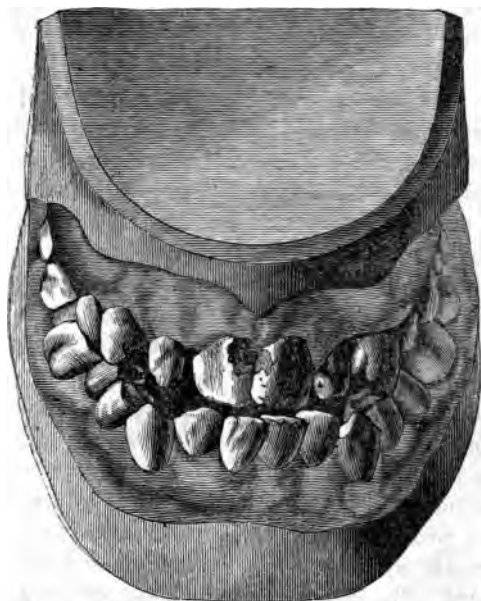


FIGURE 9.—Front view of plaster casts representing the teeth of a boy aged seventeen (Cabinet No. 61).

This state of things has been caused, it may be surmised, by neglect of the temporary teeth of the upper jaw and their premature removal, thus causing contraction of the superior maxillary arch. When the permanent teeth came into the mouth, the upper jaw being too small to allow them to take their regular position, they were crowded and consequently irregular. When food is retained about irregular teeth their decay is almost inevitable, and in the case before us such neglect seems to have caused early decay of the first permanent molar teeth, which were accordingly extracted;

their loss occasioned a contraction of the superior maxillary arch to the extent of at least one inch.

The lower teeth not having suffered in a similar manner to the upper, the inferior maxillary bone has gained its normal size, and the lower teeth, in consequence, close *outside* of the upper (Fig. 9). Of course the teeth have caused irritation in this case from a very early period in the person's life, and their condition has likewise interfered with mastication. The deformity of the face in these cases is very great.¹

Dental inspection.—Neglect of the teeth among the children of the poor can only be prevented by some system of inspection. Among the well-to-do advice only can be given, but in the public schools arrangements could be made to secure competent assistance from the dental departments of some of the charitable institutions. In places where such institutions do not exist the services of some competent dentist could be obtained. (See page 29.)

¹ The author desires to acknowledge his indebtedness to J. M. Stebbins, D. D. S., of New York, for his valuable services in this investigation, and particularly for the impressions of the teeth. To his skill in the treatment of such cases many of the children were afterwards indebted for relief.

OUTDOOR BATHING AND ITS EFFECTS ON THE EAR.

Bathing in the ocean, rivers, and ponds is a summer pastime to which children are very much addicted; it is generally regarded as harmless, provided drowning does not take place. If any cautionary measures are thought to be worth while they are usually embraced in two sentences: "Be sure first to wet the head" and "Be careful not to get drowned." This advice to immerse the head immediately on entering the water is certainly not wise, and the other caution may be regarded as an unnecessary expenditure of parental concern. Although the exercise of swimming and the self reliance learned from taking care of one's self unassisted in the water have their advantages, yet the evils arising from a too prolonged stay in the water certainly more than counterbalance the possible good that may accrue. From a strictly sanitary point of view it may be doubted if, upon the whole, the loss is not greater than the gain, for children will not exercise any judgment in such matters. Supervision of bathers is not always practicable, but parents and teachers may impart some serviceable advice, which, if followed, may be the means of preventing injury to the ear, which is more liable to injury from the direct effect of the water in bathing than any other organ of the body. Marine animals possessing delicate acoustic organs have them protected from the water by the provision of nature; they are able, in fact, to close up the passages leading to the ears when they are submerged. Man, however, being in no sense a marine animal, has not been provided with self protecting ears; he must, therefore, guard against the entrance of water by devices of his own, which can be at best only partially successful. He may thus in a measure keep the water out of the auditory canal by closing it with pellets of wool, that obtained from the sheep being preferable to cotton on account of its non-absorbent qualities. The excluding of water from the mouth and nose in the surf, or when swimming or diving, is not so easily accomplished, depending as it does on an effort of the will. Holding the nose or plugging its anterior openings is impracticable in most instances.

I have seen many cases of severe aural disease among children—the milder ones are probably neglected—from the use of the New York public baths. Owing to the negligence of some of the superintendents of these establishments, aural disease is frequently contracted by the bathers. Although children are not permitted to remain more than a few minutes in the water, yet they manage, by making the most of the time at their disposal, by diving and struggling in the cold salt water, to get enough of it in their ears to injure the organ more or less.

Those who bathe very much are liable to suffer from slight injuries to the ears from time to time, and, inasmuch as pains are not always present, no trouble is suspected until very considerable impairment of hearing occurs. The exposure of the body on coming out of the water to the gradual drying influences of the wind is, of course, to be avoided. (See page 16.)

MOUTH BREATHING.

A noticeable practice among some school children is that of habitually breathing through the open mouth, a custom that has been regarded as a consequence of defective hearing; but the reverse of this is true; such breathing arises from obstructions of the nasal passages, irregular teeth, enlarged tonsils, &c., and in many instances the habit is acquired where no physical cause is known to exist. Habitual mouth breathing prevents the normal renewal of air in the drum from taking place.

Deformity of the drum-head is a consequence of the absence of the proper amount of air in the drum during the period of its development. The sound transmitting mechanism is crippled by this deformity, and the sense of hearing is correspondingly impaired.

When no physical necessity for this practice exists, its continuance should be discouraged; breathing should take place through the nose, nature having provided this organ with warming cavernous departments which temper the air before it enters the lungs. The great influence that irregularities of the teeth have on mouth breathing is believed to be of sufficient importance to warrant the introduction of a cut (Figure 9, page 34) which represents the case of a lad who became exceedingly deaf from this cause. Every one must have observed the hideous facial expression of persons whose ill developed jaws, irregular and projecting teeth, prevent closure of the mouth.

WHAT TO DO WHEN FOREIGN BODIES GET INTO THE EXTERNAL AUDITORY CANAL.

Foreign bodies in the external auditory canal are not always an inconvenience, nor do they always cause deafness, but when their presence in this situation is discovered efforts for their removal are usually undertaken with an energy proportionate to the alarm of the child's friends, and, when their own efforts have been unavailing, the assistance of some convenient druggist or barber is obtained; these only too often succeed in pushing the offending substance farther in, and then the unskilful work may be carried still further by some bungling pretender, who soon causes irreparable injury to the hearing organ by his more ambitious attempts. Such treatment by incompetent persons at best only results in pushing the foreign body farther into the passage, where its presence against the drum-head may do much harm. Even death is reported to have followed the fruitless probing and tearing of a child's ear, when no foreign body was present. It is a safe rule, therefore, to let foreign bodies alone unless competent aid can be obtained. (See page 12.)

Live insects sometimes gain an entrance into the auditory canal, where their movements give rise to much distress, especially if the drum-head is reached by them; their expulsion can be secured by filling the upturned ear with warm water.

BOXING THE EARS.

Happily the coarse and cruel practice of boxing and pulling the ears as a means of corporal punishment in the schools is nowadays seldom heard of; a few instances only have come to my knowledge through the reports of hospital patients; among common people, however, it is not unusual to find the drum-head ruptured by a blow inflicted by the hand of an enraged parent, and, as there is reason to believe that injuries of this kind are not always reported, we probably see only the severer cases. Death has resulted from a blow upon the ear; in any case the drum-head is liable to be ruptured and hearing permanently impaired.

Punishment cannot be safely inflicted by boxing the ears, and pulling the auricle even is not only very painful, but is sometimes followed by injury to the deeper seated parts.

STREET NOISES.

Some of the school-houses of cities are necessarily erected in the noisy districts, for they must be near to the homes of the pupils. The unremitting din of street noises is undoubtedly distracting, especially when the doors and windows have to be kept open; such sounds fatigue the mind, however familiar they may be. The discomfort from this cause should be considered in selecting the site for a building, and the construction of pavements which allow of the noiseless passage of vehicles in the immediate neighborhood would be advisable.

THE PHYSICAL WELL-BEING OF PUPILS.

The question of the accountability of the public schools for the physical as well as intellectual improvement of children is, to some extent, a debatable one; it is a matter that seems to depend, in many instances, on the sense of duty that inspires the management of particular schools, inasmuch as the recommendations for the guidance of teachers concerning hygienics are entirely inadequate. The writer believes that, as regards the more unfortunate children of the very poor—the unwashed of both body and raiment—no inconsiderable number of them would be more benefited by personal hygiene than by mental training; at least the two should go hand in hand in every instance: *Mens sana in corpore sano*.

The chief object of the public school system being the elevation of the entire population, thus placing them beyond the boundary of charitable support, their bodily well being must be assured by influences brought to bear during the formative period of life.

Children whose hearing has been impaired by scarlet fever, measles, or other diseases of youth, are very often neglected by parents who have neither the knowledge nor the time to give them proper care; or their ears have been purposely "let alone" by the physician's advice; these, when sent to school, greatly annoy the teacher by the vexatious delays which their instruction occasions and by the hindrance they are to others. Notwithstanding the fact that the neglect of parents and

physicians throws increased labor on the teacher, he must take some action respecting this class; for, besides being deaf, many of them suffer from offensive discharges, which are not only an evidence of the progress of aural disease, but are very objectionable to cleanly children who are obliged to sit near them. In numerous instances the teacher may find that his pupils are exceedingly deaf without being aware of the defect themselves; the present writer has known children who could not understand a word spoken to them to remain in school for years without any efforts being made to better their condition; they were regarded as defective in intellect.

Whatever rules may be established to meet the exigencies arising out of deafness in the schools, the teacher may do much to ameliorate the condition of these unfortunate pupils by making himself conversant with their wants and by prudent and considerate treatment of them while under his charge; and by the enforcement of hygienic regulations a great deal may be accomplished in the way of prevention.

CONCLUDING REMARKS.

The enumeration of all the influences which are liable to affect the sense of hearing in children would be difficult in a paper like this; indeed, when it is seen that no one unhealthy organ can fail to have a deleterious effect on some other organ or on the whole system, there must be a limit to the discussion of the consequences thereof on the ear; enough has been said, the writer trusts, to impress on those concerned the importance of care, combined with a certain degree of solicitude, in the management of the class under consideration; otherwise great injustice may be done them.

In their examinations, deaf children, notwithstanding their defects, may come forward well prepared; but if examined in a hasty or impatient manner, the teacher's questions are liable not to be heard well enough to elicit correct answers, and they are thus unable to secure a promotion which their preparation has justly entitled them to receive.

The surroundings of these children are in every way discouraging; they are disheartened both at home and at school, subjected, as they are, to the jeers, ridicule, and mockery of their companions and to the punishment of parents and teachers for seeming inattention and dulness.

Their inability to hear much of what is said to them, the difficulty they experience in the correct enunciation of words when the vocal organs are deficient, and the dismay occasioned by autophonous hearing and noises in the head, either singly or combined, are sufficient to entirely discourage these sufferers. That they become distrustful, deceitful, and vicious in character is to be expected.

Seeming inattention and dulness arise from the inability to hear, and when proper training has been wanting both at home and at school, in many instances the child will naturally accept the situation and cease to be attentive; it is important, therefore, to maintain the child's inter-

est in instruction by special methods, which shall not permit any slurring work to be done by either teacher or pupil.

Dumbness, so called, proceeds from the indescribable sensation experienced by the child in hearing its own voice within the head or as the voice of a person at a distance; these phenomena of the voice very often confound even the most intelligent person, so difficult is it to understand why such seeming strange alterations in the voice should occur.

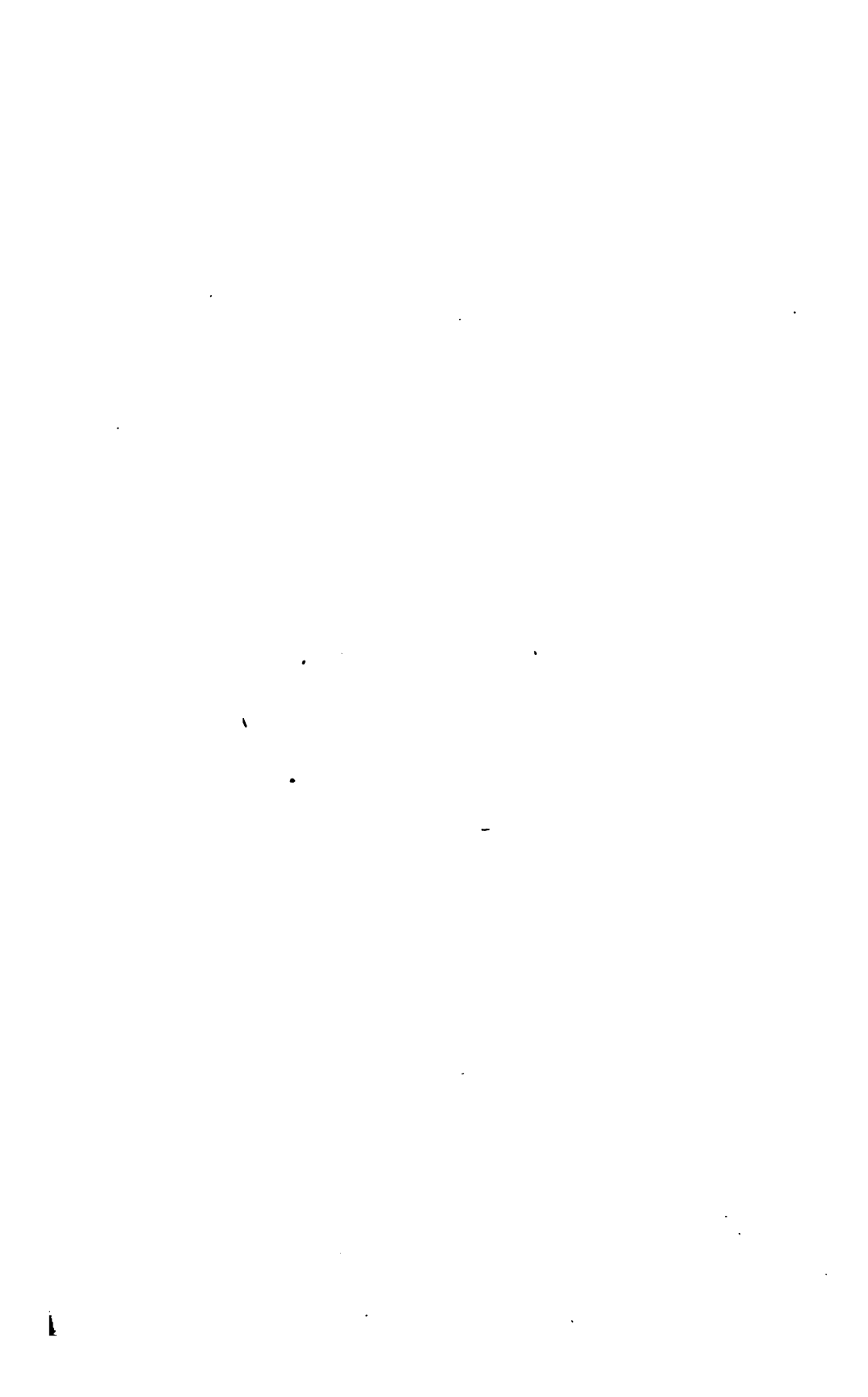
When the child experiences autophonous voice, it fancies that it has been deprived of the ability to speak, for, to it, the voice seems to fail of utterance;¹ it now becomes convinced that it is "dumb," and with the feeling comes the peculiar "dumb" expression. But this is by no means always the entire experience of the sufferer, for the voice, which has been said to seem to fail of utterance, seems to ascend into the head, where its unusual reverberations give rise to the belief that the head is "hollow" or "empty." These are alarming symptoms, and, inasmuch as they recur with every attempt at speech, the child fears to make an effort which is attended by such disagreeable symptoms.

Noises in the head are seldom absent when autophony exists. The character of the noise depends very much on the imagination of the patient, and may, therefore, be said to be variable; but it is also influenced greatly by changes in the transmitting mechanism. In the worst cases the patient hears the rushing of a railway train in the head or the raging of a storm; these noises are attended by sounds of ringing bells, pattering hail or rain, &c. When the patient has an interval of relief the noises are more bearable; they may then be likened to the gentle sighing of the wind among the trees, the play of the surf on the sandy beach, the singing of the tea kettle, the buzzing of insects, &c. Patients usually describe these noises as resembling some familiarly remembered sound; thus the distant roar of a waterfall occurs to one, or the pattering rain to another whose memory goes back to the days when he slept just beneath the roof. But very often the imagination fails to aid in the description, and with children the difficulties in the way of finding out their feeling are almost insurmountable.

When we come to consider what effect these various experiences must have on the minds of children,² our sympathies should be enlisted in their behalf to the last degree and our patience should be without limit; in a word, when no apparent cause for a child's dulness of action is known to exist, let there be made a thorough investigation into the condition of the acoustic organs before necessarily regarding it as a dunce or feeble-minded.

¹ The reader will please remember that, although persons with autophonous voice fancy that they are dumb, or at least dumb in some degree, yet their voice is in reality plainly heard by others.

² The hearing of the greater number of children who have these autophonous experiences remains pretty good as regards what is said to them most of the time; but when suffering from an aggravation of the trouble the noises in the head cause temporary interference, and then greater deafness is experienced.



APPENDIX.

The following tables exhibit the results of twenty examinations made by the author in the New York public and Roman Catholic parochial schools, with the view of ascertaining the hearing power of the pupils.

Tables I to XII, inclusive, show the number of children examined in the colored public schools.

Tables XIII to XVII, inclusive, show the number examined in the Roman Catholic parochial schools.

Tables XVIII to XX, inclusive, show the number examined in the white public schools.

These examinations are not offered as complete, but rather as pioneering efforts which were made by the writer under difficulties.

Differences in the examiner's tone of voice and in the acoustic properties of the rooms prevented uniform results from being obtained. It is a noteworthy fact, however, that about the same ratio of earaches previously experienced was found in all the classes where inquiries on that point were made. From this the inference may be drawn that the etiological factors were similar and that about the average amount of injury to the ear had, therefore, occurred in every class. No attempt was made in these examinations to record the lesser aural defects, which when present are by no means unimportant.

It will be observed that in all the examinations the teachers and pupils were seldom aware that any deafness existed.

Tables showing the results of examinations as to the hearing power of school pupils.

Table.	Number of classes examined.	Number in class.	Sex of class.	Average age of class.	Name of school.	Date of ex- amination.	Degree of impairment of hearing for the voice.
I.	1	29	M. & F.	About 10	Grammar department of Colored Grammar School No. 3.	Apr. 23, 1890	Case 1. Female. Hears loud voice only in the right ear; ordinary voice in the left ear. Case 2. Male. Hears loud voice only in the left ear; ordinary voice in the right ear.
<p>REMARKS.—The teacher who examined this class had a low and soft, but distinct voice, and asked the children familiar questions only; they were not required to repeat any test questions that would tax the memory. A very considerable number of them had this sentence repeated several times before they were understood. The teacher said that she had never before observed any deafness in the class. The children were mostly mulattoes; thirteen of the number recollected having had earaches, and it is probable that but few of these possessed normal hearing.</p>							
II.	1	18	M. & F.	About 13	Grammar department of Colored Grammar School No. 3.	Apr. 23, 1890	Case 1. Hears loud voice only in the left ear; ordinary voice in the right ear.
<p>REMARKS.—The teacher was not aware that any of the pupils were hard of hearing. Thirteen of this class stated that they had previously experienced earaches.</p>							
III.	2	25	.....	About 11	Primary department of Colored Grammar School No. 3.	Apr. 23, 1890	Case 1. Hears loudest voice only in each ear; occupies a front seat.
<p>REMARKS.—Fifteen of the children composing these two classes had experienced earaches.</p>							
IV.	2	38	.....	.....	Primary department of Colored Grammar School No. 3.	Apr. 23, 1890	Case 1. Hears loud voice only in the left ear; ordinary in the right ear.
<p>REMARKS.—The teachers, when first asked, were unaware of any deafness in these classes, but afterward recalled the above case. Twelve of these children recollected having experienced earaches. These were among the youngest children in the school, and I was unable to determine in doubtful cases whether the failure to reply correctly was owing to want of intelligence or to impairment of hearing.</p>							
V.	1	15	.....	11	Grammar department of Colored Grammar School No. 3.	Apr. 27, 1890	Case 1. Many years deaf. Hears only loudest voice in the right ear, and loud voice only in the left ear.
<p>REMARKS.—The teacher was aware of this one case; he was, she said, a "little deaf," and being a mischievous boy he was required to occupy a back seat. Four of these pupils stated that they had suffered with earaches.</p>							

DEAFNESS AMONG SCHOOL CHILDREN.

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VI.	1	21	About 12	Grammar department of Colored Grammar School No. 3.	Apr. 27, 1880	None of the pupils of this class were found to have any marked impairment of hearing for the voice.
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REMARKS.—Twelve of these pupils stated that they had experienced earaches.

VII.	2	23	15	Grammar department of Colored Grammar School No. 3.	Apr. 27, 1880	Case 1. Hears loud voice only in the right ear; ordinary voice in the left ear. Case 2. Hears loud voice only in the left ear; ordinary voice in the right ear.
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REMARKS.—These two deaf pupils were mulattoes. The teachers were not aware before the examination of the presence of any deaf pupils in these classes. None of the pupils themselves were aware that they had any aural defects, nor did any of them remember having experienced earaches. Some of the pupils were over eighteen years of age, and seem to have forgotten these very common experiences of youth.

VIII.	2	63	M. & F.	7 to 12	Primary department of Colored Grammar School No. 3.	Apr. 27, 1880	Case 1. Hears loud voice only in the left ear; ordinary voice in the right ear. Case 2. Hears loud voice only in both ears. Case 3. Hears loud voice only in the right ear; ordinary voice in the left ear. Case 4. Hears loud voice only in the right ear; ordinary voice in the left ear. Case 5. Hears loud voice only in the right ear; ordinary voice in the left ear. Case 6. Hears loud voice only in the left ear; ordinary voice in the right ear. Case 7. Hears loud voice only in the right ear; ordinary voice in the left ear. Case 8. Hears loud voice only in the left ear; ordinary voice in the right ear. Case 9. Hears loud voice only in the left ear; ordinary voice in the right ear. Case 10. Hears loud voice only in both of the ears.
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REMARKS.—Six of these pupils were mulattoes, one of them was quite dark, and the color of the other three was not noted. The teachers had been unaware of any case of deafness among these pupils, and but two of the pupils themselves were aware that they were hard of hearing. Eighteen of the number had experienced earaches.

IX.	1	14	14	Grammar department of Colored Grammar School No. 3.	May 19, 1880	Case 1. Hears shouted voice only in the right ear; loud voice only in the left ear. Case 2. Hears loud voice only in both of the ears.
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REMARKS.—One of these pupils was a mulatto, the other was dark colored. Neither the teacher nor any of the pupils knew of any deafness in the class before the examination.

Tables showing the results of examinations as to the hearing power of school pupils—Continued.

Table.	Number of classes examined.	Number in class.	Sex of class.	Average age of class.	Name of school.	Date of ex- amination.	Degree of impairment of hearing for the voice.
X.	1	33	.....	12	Grammar department of Colored Grammar School No. 2.	May 19, 1880	Case 1. Hears loud voice only in the right ear; ordinary voice in the left ear.
REMARKS. —This pupil was a mulatto. The teacher of this class once had a pupil who was temporarily deaf, but she knew of no deafness in the class at the time of the examination. The pupils themselves were not aware of any case of hardness of hearing in the class; nine of them, however, had experienced earaches previous to this examination.							
XI.	1	28	.....	6 to 10	Grammar department of Colored Grammar School No. 3.	May 19, 1880	None of these pupils were found to have impaired hearing for the voice.
REMARKS. —Neither the teacher nor any of the children themselves knew of any case of deafness in this class. Fifteen of the pupils stated that they had experienced earaches.							
XII.	1	23	.....	6 to 9	Primary department of Colored Grammar School No. 2.	May 19, 1880	Case 1. Hears loud voice only in the right ear; ordinary voice in the left ear. Case 2. Hears loud voice only in the right ear; ordinary voice in the left ear. Case 3. Hears loud voice only in the right ear; ordinary voice in the left ear. Case 4. Hears shouted voice only in the right ear; ordinary voice in the left ear.
REMARKS. —Two of these pupils were mulattoes, one was dark, and the color of the other was not noted. The teacher knew of no cases of impairment of hearing before the examination was made; one of the pupils only was aware of his own deafness. Ten of this class stated that they had previously experienced earaches.							
XIII.	1	35	F.	8 to 12	Roman Catholic parochial school of the Church of the Assump- tion.	May 18, 1880	Case 1. Hears loud voice only in the left ear; ordinary voice in the right ear. Case 2. Hears only loud voice in both of the ears. Case 3. Hears loud voice only in the left ear; ordinary voice in the right ear. Case 4. Hears loud voice only in the right ear; ordinary voice in the left ear.
REMARKS. —The teacher was not previously aware that any of the pupils had imperfect hearing, nor were the pupils themselves. Sixteen of them remembered having had earaches.							

XIV.	1	40	F.	9 to 13	Roman Catholic parochial school of the Church of the Assumption.	May 18, 1880	Case 1. Hears loud voice only in the right ear; ordinary voice in the left ear. Case 2. Hears loud voice only in the right ear; ordinary voice in the left ear.
REMARKS.—Neither the teacher nor the pupils themselves were aware of any impairment of hearing in the class. Five of the pupils stated that they had suffered with earaches.							
XV.	1	48	M.	9 to 13	Roman Catholic parochial school of the Church of the Assumption.	May 18, 1880	Case 1. Hears loud voice only in the right ear; ordinary voice in the left ear. Case 2. Hears loud voice only in the right ear; ordinary voice in the left ear.
REMARKS.—Neither the teacher nor the pupils themselves were aware that any deafness existed in the class. Thirteen of the pupils had had earaches.							
XVI.	1	48	M. & F.	8 to 12	Roman Catholic parochial school of the Church of the Assumption.	May 21, 1880	Case 1. Hears loud voice only in the right ear; ordinary voice in the left ear. Case 2. Hears loud voice only in the left ear; ordinary voice in the right ear. Case 3. Hears loud voice only in the left ear; ordinary voice in the right ear. Case 4. Hears loud voice only in the right ear; shouted voice in the left ear. Case 5. Hears loud voice only in the right ear; ordinary voice in the left ear. Case 6. Hears loud voice only in the right ear; ordinary voice in the left ear. Case 7. Hears loud voice only in both of the ears; does not hear any sentence completely. Case 8. Hears loud voice only in both of the ears. Case 9. Hears loud voice only in both of the ears. Case 10. Hears loud voice only in the right ear; shouted voice only in the left ear. Case 11. Hears loud voice only in the right ear; ordinary voice in the left ear. Case 12. Hears loud voice only in the right ear; ordinary voice in the left ear. Case 13. Hears loud voice only in the left ear; ordinary voice in the right ear.

REMARKS.—The teacher was not previously aware that any of the pupils were deaf. Five of the pupils stated that they were previously aware of having defects in hearing.

Tables showing the results of examinations as to the hearing power of school pupils—Continued.

Table.	Number of classes examined.	Number in class.	Sex of class.	Average age of class.	Name of school.	Date of ex- amination.	Degree of impairment of hearing for the voice.
XVII.	1	55	M. & F.	6 to 11	Roman Catholic parochial school of the Church of the Assump- tion.	May 21, 1880	<p>Case 1. Hears loud voice only in the right ear; ordinary voice in the left ear.</p> <p>Case 2. Hears loud voice only in the left ear; ordinary voice in the right ear.</p> <p>Case 3. Hears loud voice only in the right ear; ordinary voice in the left ear.</p> <p>Case 4. Hears loud voice only in the left ear; ordinary voice in the right ear.</p> <p>Case 5. Hears loud voice only in both of the ears.</p> <p>Case 6. Hears shouted voice only in the left ear; ordinary voice in the right ear.</p> <p>Case 7. Hears loud voice only in both of the ears.</p> <p>Case 8. Hears loud voice only in the right ear; ordinary voice in the left ear.</p> <p>Case 9. Hears shouted voice only in the right ear; loud voice in the left ear.</p> <p>Case 10. Hears shouted voice only in the left ear; loud voice only in the right ear.</p> <p>Case 11. Hears shouted voice only in both of the ears.</p> <p>Case 12. Hears loud voice only in the right ear; ordinary voice in the left ear.</p> <p>Case 13. Hears loud voice only in the right ear; ordinary voice in the left ear.</p> <p>Case 14. Hears loud voice only in both of the ears.</p> <p>Case 15. Hears shouted voice only in the left ear; ordinary voice in the right ear.</p>
REMARKS.—The teacher never regarded any of the class as hard of hearing. Eighteen of the pupils had experienced earaches.							
XVIII.	1	27	M.	11 to 15	Grammar School No. 35, New York Public Schools.	Mar. 5, 1880	<p>Case 1. Hears loud voice only in the right ear; ordinary voice in the left ear.</p> <p>Case 2. Hears shouted voice only in the right ear; ordinary voice in the left ear.</p>

REMARKS.—The teacher was not aware of any deafness in the class previous to the examination. This class of boys is particularly bright; it is recruited from the well-to-do class of citizens. Mr. Henry E. Pellow, a commissioner of education, who kindly accompanied the author, inquired of these boys if any of them were hard of hearing; eleven of them said they were. This apparent discrepancy between the recorded result of the examination and the replies given to Mr. Pellow's inquiry is accounted for by the fact that the teacher's voice was loud and distinct and he had endeavored to put the questions plainly.

XIX.	1	27	M.	11 to 15.	Grammar School No. 35, New York Public Schools.	Mar. 5, 1880	Case 1. Hears loud voice only in the right ear; ordinary voice in the left ear. Case 2. No hearing remains in the right ear; hears shouted voice only in the left ear.
REMARKS.—Neither the teacher nor the pupils themselves were aware that any case of deafness existed in the class. The examination of this class took place in the presence of Mr. Henry E. Pellew, one of the commissioners of education. Cases of slight impairment were not noted.							
XX.	1	29	M.	10 to 13.	Grammar School No. 21, New York Public Schools.	Feb. —, 1880	Case 1. Hears loud voice only in the right ear; ordinary voice in the left ear. Case 2. Hears loud voice only in the right ear; ordinary voice in the left ear. Case 3. Hears loud voice only in the right ear; ordinary voice in the left ear. Case 4. Hears shouted voice only in the left ear; ordinary voice in the right ear. Case 5. Hears loud voice only in the right ear; ordinary voice in the left ear. Case 6. Hears loud voice only in the left ear; ordinary voice in the right ear. Case 7. Hears loud voice only in the left ear; ordinary voice in the right ear. Case 8. Hears shouted voice only in the left ear; ordinary voice in the right ear. Case 9. Hears loud voice only in the right ear; ordinary voice in the left ear. Case 10. Subject to colds in the head, when he cannot hear loud voice in the right ear. Case 11. Hears loud voice only in the left ear; ordinary voice in the right ear.

¹Case 4 was suffering with a severe cold in the head at the time of the examination.

REMARKS.—The hearing of this class was tested by the teacher, who gave the pupils short sentences to repeat from a newspaper. He ascribed some of the failures to repeat the sentences to their length. One of the boys found to be deaf had always been regarded as a dull pupil; his seat was on the fourth row from the front.



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LETTER.

DEPARTMENT OF THE INTERIOR,
BUREAU OF EDUCATION,
Washington, December 12, 1881.

SIR: In the first circular issued by this Office after I undertook its duties attention was called to the effects of school work upon the eyesight of pupils. The subject has been considered in the Office at different times since, as opportunity has offered. Public interest is especially aroused with reference to the importance of treating color blindness and shortsightedness.

At the meeting of the National Educational Association in July last, Dr. Calhoun, professor of diseases of the eye, ear, and throat in the Atlanta Medical College and an eminent oculist of that city, read a paper on the effects of student life on the eyesight. The paper was warmly approved by the distinguished educators present and its issue by this Office specially desired. I hereby recommend its publication as a circular of information.

Very respectfully, your obedient servant,

JOHN EATON,
Commissioner.

The Hon. the SECRETARY OF THE INTERIOR.

Publication approved.

S. J. KIRKWOOD,
Secretary.



EFFECTS OF STUDENT LIFE UPON THE EYESIGHT.

There have always been and even in our own day and time there still are those who are in doubt as to which is the most important of all our organs of sense. But especially often is the question asked, "Which is the greater deprivation, the loss of sight or the loss of hearing?" How almost universal is it that the blind appear bright, happy, and cheerfully resigned to the great loss they have sustained, while the deaf are not unfrequently dissatisfied, unhappy, and mistrustful. It has been my lot to have had much intercourse with these two classes, as well in private life as in the well filled and well managed institutions for their benefit throughout various portions of the world; and this remarkable contrast between them is the more apparent the more thorough and the more intimate my acquaintance becomes. The doubt, indeed, is untenable, for in the eye we have that organ which brings us into the most immediate relation and connection with the outer world, with mankind, with the brute creation, with all nature; for nature best expresses herself to us through her visibleness—eyesight alone enables us to comprehend. Nature offers much less for the hearing, for never can we learn to conceive of objects as they really are from the noises which may emanate from them and perceptibly strike our ear. On the contrary, imagination readily brings to mind the soft notes of the musical instruments that we see. We can often understand and comprehend men without hearing them, from the movements of the body and from their countenances: we can read from their lips what they speak when not a single tone is audible.

That sight is a direct aid and support to each of the other organs of sense can be readily tested and proven by each and every one. The finest and most delicate viands never taste so well as when we see them. The enjoyment of the most fragrant flower is considerably heightened by the sight of it. A sensation, however pleasant to the touch, is infinitely increased when we see the cause that calls it forth.

It is in the school room that the largest and most important portion of the child's life is spent, and while the whole energy is bent upon the proper development of the brain, it is not seldom that too little attention is given to the true maxim that "only in a healthy body can a healthy mind live." During these same years must the physical development progress; but how often can we trace back to those school days the groundwork of bodily ailments which prove to be stubborn barriers to all future advancement.

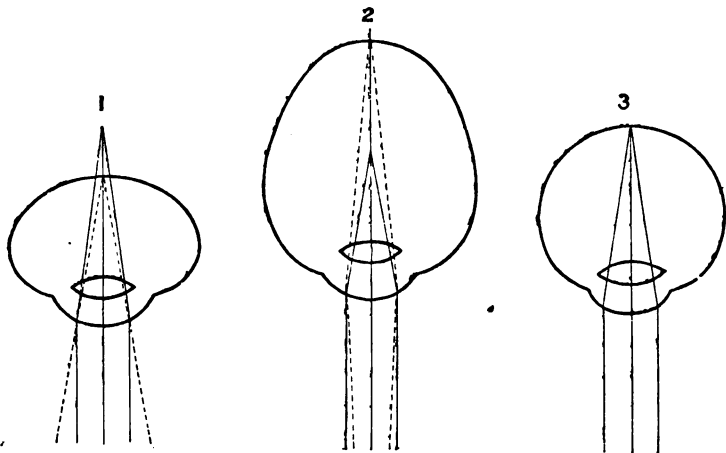
Now, as the eye must play the role of a mediator between the sub-

jects to be learned and the working brain, it is easy to understand that in the same proportion that work is demanded of the brain does a tax fall upon the eye; thus it happens also that the eye, which, like the general body, is perfecting itself during these very years of school life, undergoes not unfrequently powerful changes, which we can speak of only as diseased conditions, not only not admitting of cure, but here and there leading to the destruction of the organ of sight. After we have shown that the eye suffers such powerful and unwholesome changes during the years spent in the school room, then it is our purpose to demonstrate that certain influences during these years *originate* diseases of the eye, enumerating, in conclusion, the means with the help of which we hope to be able at least to limit the frequency and degree of intensity of these diseases.

DIVISION OF THE SUBJECT.

We always judge of an eye according to its length, and in eyes of different length we have different vision. In this particular we recognize three different conditions known as conditions of refraction. These are, first, hypermetropia, or oversightedness; second, myopia, or nearsightedness; third, emmetropia or normalsightedness.

That these conditions may be clearly understood, and for a thorough comprehension of the dangers dependent upon the second one, it is perhaps well that I should say a few words descriptive of them.



The hypermetropic or oversighted eye is too short a ball, and is a congenital defect.

The myopic or nearsighted eye is too long a ball, and in every degree from the slightest to the greatest is not only a real defect but also an absolute disease.

HYPERMETROPIA.

In the interior of every eye there is a circular muscle (the ciliary) known as the muscle of accommodation, by whose action we are enabled

to accommodate our vision to all distances, to near, distant, and all intermediate points. In the emmetropic or normalsighted eye, the action of this muscle produces no peculiar or unpleasant sensations, for it acts within its normal limits. But in the oversighted or hypermetropic eye, both for seeing distinctly in the distance and very specially for seeing near objects, this little muscle must exercise excessive force; and, indeed, the excess of force is the greater the more oversighted the eye or the shorter the ball. A muscle that is brought into constant unnatural activity gradually passes over into a convulsive, spasmodic condition or is so much fatigued that it is no longer able to undergo work. Both of these conditions take place in the human eye. The characteristic symptoms of this condition are as follows: Such persons (adults as well as children) are able to execute the very finest work, for a greater or less time, perhaps without trouble, then gradually, maybe suddenly, the work becomes indistinct, obscured, and things seem to run into one another. At times it appears as if a cloud were floating immediately in front of the eye, and one is no longer able to continue the work, and as a consequence a few moments' rest follows; the eyes are rubbed, and after a pause of a short interval the work is again resumed, but mostly only for a short time, for the same symptoms return. Particularly is this the case towards evening, after an entire day's toil, or towards the end of the week, after a whole week's constant use of the eyes, while on Monday, and especially Monday morning, in consequence of resting the eye, and therefore resting the muscle of accommodation on the inside of the eye, during Sunday, the vision is at its very best. In some instances this wearied condition of the muscle appears so suddenly that the persons affected think themselves blinded, and when they seek assistance and are told that the use of proper glasses will forever remove the trouble, they are astonished as well as rejoiced. Unfortunately, it is not seldom the case that a great wrong is done children affected with oversightedness, parents and teachers attributing the difficulty with which they advance in their studies to a "stubborn will" or "idleness," manifesting itself in their complaints of tired eyes, inability to go on with study, headaches, and so on, when in truth it is due to the overtaxed muscle of accommodation. I have had frequent occasion to call these facts to the attention of parents and teachers whose children or pupils may have been sufferers from oversightedness.

MYOPIA.

But it is to that condition of refraction known as myopia or nearsightedness that I wish to direct attention specially, for while the oversighted eye is an eye of defective growth without disease, the nearsighted ball is not only defective in growth, for it is too long, but is in the real sense of the term a diseased eye. The celebrated Donders, in his work on refraction, takes this as his motto: "I speak it without hesitation, that a nearsighted eye is a diseased eye." Let every one, then,

seek diligently not to become nearsighted. As we have seen, the longer the eye the greater the nearsightedness, and the highest degree of this corresponds to the longest eye. Very rarely before the fifth or sixth year of life does nearsightedness make its appearance, about which time children usually begin their attendance upon school; but from this time on, under certain unfavorable circumstances, the eye gradually elongates, reaching and remaining perhaps at a certain point of elongation, a slight or high degree, or constantly increasing through all the years of school life, even to the twentieth or twenty-fifth year, and indeed in some instances continuing slowly to lengthen through almost the whole of life.

CONSEQUENCES OF MYOPIA.

But it is not simply the elongation of the ball that is so much to be feared, but consequent changes which have an important bearing on the acuteness of vision, on the movements and on the very existence of the eye. If one hundred men with perfectly good eyes are able to recognize or read at a certain distance, say twenty feet, one and the same letter or number of letters, it is reasonable to conclude that any other person with equally good eyes can recognize and read the same letter or letters at the same distance. But if one is incapable of doing this, even with the defect of refraction (if such exists) corrected by proper glasses, then this one has less acuteness of vision than the one hundred who are able to do so. This diminution of vision is a frequent and common circumstance with nearsighted individuals, and depends upon the diseased changes taking place on the interior of the eye brought about by the abnormal lengthening of the ball. The movements of the ball are controlled by six muscles, and over their action nearsightedness exercises a very great influence, because of the ball being so long. There exists a peculiar but certain connection between nearsightedness and the contraction of one of these muscles (the outer), causing the eye to turn outwards and constituting what in common parlance is known as external squint or cross eyes. A corresponding connection exists also between oversightedness and internal squint, so that, indeed, in the majority of instances we are able to say when we see a person squinting outwards that he is nearsighted, and when inwards that he is oversighted. There are, of course, exceptions to this rule. In every nearsighted individual the very existence of the eye is in danger, but especially so in those cases of progressive myopia attaining finally a high degree. Such an eye may any moment become suddenly blinded through detachment of the retina, the lining nervous membrane of the interior of the eye, resulting always in a very material reduction of sight, and in the majority of cases in irretrievable loss of vision.¹

¹ Predisposition to myopia is almost always inherited by at least some of the children where one parent is myopic. In these children myopia may often be detected, if sought for, at a very early age, and is generally evident at from eight to twelve years

Doubtless the question has already been asked, Cannot this too short eye be made longer and this too long eye be made shorter? No, I answer, for these changes in the eye must remain forever unchanged; but we can correct the defect in the oversighted eye, in so far as the unpleasant and painful symptoms from the use of such an eye are concerned, and make the vision as comfortable as in the normalsighted person. And we can make the nearsighted see not only near but distant objects. It would be out of place here to go into a detailed description of the means at our command for such correction. Suffice it to say, it is done in the first instance (the oversighted eye) by the use of convex, in the second (the nearsighted eye) by the use of concave glasses.

The question naturally propounds itself, Are we able to prevent this diseased lengthening of the eyeball, this nearsightedness, or after it has begun are we in condition at least to prevent its increase? This is a question full of the most vital importance, and it is the question that has led to the investigation of the eyes of a very large number of school

of age. Once present, it tends to increase, and should be watched with care. If not existing at least in some slight degree before sixteen years of age it is never developed, even by excessive use of the eyes; nor does it appear unless exceptionally in eyes originally hyperopic.

Three conditions of myopia are to be recognized: stationary myopia, where having reached a certain degree no other change occurs; temporarily progressive myopia, where there is for a time increase of optical and structural changes; and constantly progressive myopia, where the morbid processes go on to more or less destructive terminations.

During the period of youth, which is usually also the time of closest application to study, there is a disposition to gradual development of the inherited myopic tendency; but this may be kept in abeyance if the eyes are used principally for large objects; and if, during this period, the myopia does not become very considerable, it may remain stationary during the rest of life. Temporary increase of myopia may take place during these years of growth and of study from too close application; but, provided its degree is still moderate, its further progress may be arrested at or after maturity if the individual grows more prudent. But—and this constitutes the greatest feature of the disease—if the myopia has, during this period, already reached a high degree, the tendency to continued progress frequently cannot be arrested, notwithstanding the exercise, too late, of the greatest care; and degenerative changes go on in the tissues and media of the eye, with the sad prospect of partial or even total blindness at or before middle age.

The earlier symptoms of progressive myopia are often a mere increase in the imperfection of distant vision, without other apparent inconvenience than the need of stronger glasses. Afterward, as the changed form of the eyeball makes accommodation for near objects less easy, the eyes are readily fatigued and irritable, perhaps hyperæmic, and sensitive to light; * * * *muscæ volitantes* [or perpetually moving black spots] are often complained of. * * * The downward course of progressive myopia is accompanied by * * * much general deterioration of the acuteness of sight, * * * perhaps followed by * * * absolute loss of vision at the very period when family cares or public duties are most imperative.

Since it has been shown that it is especially by continued tension of the muscle of accommodation in study that myopia with its attendant dangers is generated and increased, and as it is well known to be only preventable and not curable, it follows

children, after it had once become positively known that nearsightedness developed itself particularly, indeed almost exclusively, and attained its very highest degree, during the years of school life.

PREVALENCE OF MYOPIA AND ITS CAUSES.

So far as I can gather, there are records of the examinations of the eyes of about 45,000 school children, of all ages and of all grades, representing both white and colored races and both country and city schools. Some of these investigations would lead us to conclude that the percentage of normalsighted children, other researches that the percentage of oversighted, prevailed in the largest degree, but all, without a single

that a change in our methods of education is an absolute necessity, or else this, which might be termed self-imposed disease, will impose a more and more grievous burden on the community.

A child having an hereditary leaning toward myopia is expected to give a large portion of time every day to study of oftentimes badly printed books, perhaps in a dim light, and sometimes with the requirement from his teacher that he shall not take his eyes from his lesson. Myopia is thus begun. As this augments, the child who does not see things about him clearly has less pleasure in the usual sports of his age, and finds more enjoyment in books. His close application to reading, writing, drawing, &c., keeps up convergence of the eyes and pressure upon them of the recti muscles, which tends little by little to increase the ellipsoid change of form and elongate the antero-posterior axis. These alterations go on during the period of growth and of most continuous study, because at this time the tissues of the globe are softer and more extensible than after maturity. If on reaching this latter term the structural changes are still only moderate in degree, the myopia may continue stationary during life. But if at this time great deviations from the normal condition have already been produced, the affected parts are less capable of resisting further yielding, and progressive myopia is thenceforward an ever-present source of danger.

As is evident from the description of the nature of the pathological changes, prevention is the sole resource at our command; restoration is impossible. And in order that preventive measures may be seasonably adopted, it is first necessary that the profession and the public should become alive to the fact that in a large number of cases myopia is one of the gravest affections of the eye, capable of limitation by constant care during childhood and youth; but if not thus limited likely to be a source of future disability and misery, and to be handed down as an onerous inheritance to children. At present the warnings inspired by frequent sad experience in the practice of every skilled observer are almost unheeded, and it is but too common to see the chances of retaining even moderately useful vision in future years recklessly sacrificed to a vain ambition for acquiring mere book knowledge, which when gained is often valueless to its possessor, or, if otherwise it could be usefully applied, cannot be made serviceable because of the imperfection of sight which has been created in obtaining it.

Very high degrees of myopia should also be recognized as an infirmity deserving careful consideration before assuming the obligations of marriage; for those in moderate circumstances may well hesitate to choose partners who, though highly cultivated, may probably at middle life become unable to provide for their households or their children.

It should be understood that if these risks of future disability are to be avoided it is imperative that when they are shown to be unmistakably present such pursuits as increase them must be at once abandoned, in whole or in part, at whatever sacrifice of preference or ambition. Parents should modify plans for their children's training and choice of pursuit, so as not to imperil their eyes. Older persons who have already

exception, prove beyond a doubt that nearsightedness, beginning, perhaps, at nothing in the lowest classes and first years of school life, steadily increases from class to class in the school, until in the highest grades or in the last years of school attendance it has actually developed itself in as many as 60 or 70 per cent. of all the pupils. Among this large number we have children whose ages range all along from five to twenty years and upwards, all similarly occupied, and during a time in which the eye undergoes its most important changes—changes which will influence more or less the regulation of the children's entire lives. In the school room we can follow the eye from its beginning on, from its primitive condition, as it were, where as yet it has been exposed to no injuri-

developed a high degree of myopia, but who feel obliged to continue their preparations for some vocation for which they are especially fitted, or in which they see opportunities, should keep in mind the risks to which they are exposed, and should avoid too intense or continuous application and efforts to obtain class rank or other temporary distinctions, and if necessary should take more time than would otherwise be required for a certain amount of work. If they expect to depend for their support upon occupations which will not only tax the eyes in preparation but in their pursuit, it is of the utmost importance to preserve these eyes in the best condition possible, and not sacrifice future prospects from disability to accomplish what they had qualified themselves to do. Those who do not study as a means of obtaining a livelihood, but merely for the pleasure of literary acquisition, should feel it a duty incumbent on them to refrain from the continuous excessive use of the eyes to which their tastes so strongly tempt them; not only that they may prevent progressive and dangerous changes in their own eyes, but also to avoid developing a condition which will often become a baleful possession for their children.

Vision has been carefully tested in many thousands of eyes of school children in Austria, Germany, Russia, Switzerland, and America, with everywhere similar results. The statistics thus gathered show that while in children at common village schools there is but 1.4 per cent. of myopia, the proportion rises to 21 per cent. in city schools of high grade, and to 40 per cent. in some universities. They show also that not only the numerical ratio but the degree of myopia is far greater in the higher than in the lower classes of the same schools—those children who had no myopia, or only a moderate amount of it, acquiring or largely increasing it in their progress through the advanced classes. Other statistics have shown that in those who studied two hours out of school the proportion of nearsighted was 17 per cent.; in those studying six hours, 40 per cent. In America, probably on account of the greater activity and variety of life and the less degree as yet of hereditary tendency, the ratio has been found to be smaller than in Europe.

These facts deserve serious attention, especially in connection with our undoubted power of modifying or arresting the progress of myopia by proper management and by self-denial during the years of growth and of education. We have seen that if myopia does not begin before the age of sixteen it is not afterwards developed. We know also that if at the age of twenty, when the system has become matured, the myopia remains only moderate in degree, not more than $\frac{1}{10}$, it may remain at this point during life, unless imprudent use of the eyes is indulged in, without exhibiting progressive features. This degree of $\frac{1}{10}$ is deemed by good authorities the line of safety. If at twenty years of age the myopia is less than this, there is little danger, with reasonable care, that further changes will declare themselves; if more than this degree exists, constant watchfulness is needed to prevent further deterioration.—(*The Diagnosis and Treatment of the Diseases of the Eye*, by Dr. Henry W. Williams, Boston, 1881.)

ous influences, and can follow it through a series of years to an age in which we can mark the boundary beyond which we can say the further development of it under certain conditions will be for good, and under other conditions for evil.

Now, we have found that in the very early years of life no eye is nearsighted, and even in the lowest classes at school no nearsightedness exists, or, if at all, only in the slightest degree, and also that in the highest and last school classes, containing the oldest pupils, as much as 70 or even a larger per cent. of the scholars are nearsighted. Knowing all this, the question presses itself upon us, How is it possible for an eye in a space of time from twelve to fifteen years to undergo such a transformation? If nature prescribes or dictates these changes in the human eye, why is it, then, that all are not nearsighted? Or do unfavorable circumstances or conditions lend their assistance in bringing about this diseased lengthening of the eyeball? Or have the sufferers inherited the disease from their parents or ancestors; and, if so, why is it that these children are not nearsighted from birth?

Some very interesting observations have been made during these investigations, and prominent among them are:

(1) That oversightedness (a too short ball) is originally the normal condition of the eye, and to reach the nearsighted state (a too long ball) the eye must pass through the normalsighted condition (a normal sized ball).

(2) That with the increase in years and with the rise in classes the number of nearsighted children more or less rapidly increases.

(3) That nearsightedness is much more frequent in city schools than in schools in the rural districts, due to the better surroundings in the country, less strain and more rest for the eye.

(4) That colored school children are remarkably free from nearsightedness, the percentage being exceedingly small. In my own examinations of this class of students, I have seen very few who were nearsighted.

(5) That children frequently have the trouble whose parents or grandparents had the same, and that the acuity of vision is more frequently defective among the nearsighted than among any others.

I have before me the results of the examinations of the eyes of nearly 2,200 school children in and around Bern, the capital of Switzerland, and I take these tables because they are a fair type of all the others. These show that a majority of the children begin school life with emmetropic or normal conditioned eyes, but that the number of normalsighted children invariably and constantly diminishes as they rise from grade to grade. They show, also, on the other hand, that myopic or nearsighted eyes scarcely exist at all, or in very small numbers, in the youngest children or in the lowest classes, but as the children grow older and go higher and higher in studies requiring closer application of their eyes, just as invariably and just as constantly does nearsightedness increase, normalsightedness diminishing under the opposite condition of

things. In similar proportion, also, as nearsightedness increases does oversightedness diminish. This shows beyond the shadow of a doubt that both normalsighted and oversighted eyes (with one of which almost all children are born), under the influence of school life and other unhealthy surroundings, gradually lose their healthy condition, until finally in the last school years and in the highest grades or classes nearsightedness, a truly diseased condition of the eye, becomes the condition of refraction in as many as 70 per cent. of those now just in the very beginning of manhood or womanhood.

This is truly a sad picture and a sad commentary upon the boasted civilization of the latter half of the nineteenth century, but it is true to the very letter, and needs but a most superficial study of the subject to convince him who doubts most.

But not only among school children do we find nearsightedness developing itself, but also among teachers, book-keepers, engravers, watch-makers, newspaper men, and indeed among all those who have occasion to look at small objects for a long time, keeping the muscle of accommodation in a continued strain for a greater or less period. In all adults, however, the disease develops itself with much less frequency and with more difficulty than in children, because the tissues forming the eyeballs in the grown person have received their growth, become hardened, and are much less influenced by excessive use than those of a child. Is it, then, a great misfortune to become nearsighted? Since a nearsighted eye is a diseased eye, this question bears its own answer upon its face. But what is the cause of nearsightedness; and since we cannot cure the disease, cannot make this too long ball short again, are we not able to prevent others from falling into the same unfortunate condition? The two principal causes are heredity and occupation. Others may exist, but they are unimportant in comparison with these two. That oversightedness is often hereditary is a matter of everyday observation, several members of the same family not only having the defect but oftentimes having it exactly in the same degree that existed in the eyes of their parents or grandparents. Of necessity must hypermetropia or oversightedness be at least congenital, but not so with myopia or nearsightedness, for it can either be hereditary or acquired. The tendency to the trouble may exist from birth, but the disease itself may never crop out unless conditions favorable to it present themselves. On the contrary, also, very many children acquire nearsightedness in whom there is no natural tendency to the disease, whose parents or grandparents were entirely free from it.

HEREDITY AS A CAUSE OF MYOPIA.

It has been mentioned that in the children in country schools nearsightedness is, comparatively speaking, scarcely to be found. These pupils are the children of parents who themselves, perhaps, attended school but little during the early years of their lives and have strained

their eyes very little on near objects; hence the absence of an hereditary tendency to the disease in their children. The parents and grandparents of city school children have themselves, perhaps for generations back, attended city schools, and have year after year engaged in those avocations in the city which are a constant strain to the muscles (particularly the ciliary) of the eye, leading ultimately to a lengthening of the ball, a tendency to which is transmitted from generation to generation. Out of nearly five hundred negro school children examined in New York by Dr. Callan, only $2\frac{1}{2}$ per cent. were found to be nearsighted, and out of thousands of the natives of British India examined by British surgeons not a single one was found to be nearsighted. Among a large number of negroes examined by myself from time to time, not more than half a dozen cases of nearsightedness have as yet been revealed. These were in grown negro men, who for eight or ten years had applied themselves unremittingly to their studies and had acquired a very extraordinary amount of intelligence, but at the cost of a defect of their eyes which must forever leave them in a diseased state. The negroes, then, are as yet but little subject to nearsightedness; because their forefathers never had occasion to use their eyes to an injurious extent they have inherited from them only the tendency to good eyesight.

MYOPIA DUE TO BAD AIR OR DEFECTIVE LIGHT.

Now, while heredity gives rise to the tendency to nearsightedness and certain subsequent avocations cause its full development in a large number of instances, still there is no doubt whatever that the avocations of individuals during school years, as well as later, are often the sole cause of the disease, without the existence of the slightest hereditary tendency. In the school room there are two kinds of influence that work injuriously upon the eyesight. Under the first are classed all those things which compel the eye to strain itself in order to see distinctly small letters or objects; under the second, all those which cause a congestion or rush of blood to the head and eyes. To the first belong bad ventilation and improper light, too small and imperfect type, pale ink, many successive hours at the same kind of work, as in reading, writing, sewing, &c., without change or rest of the eye, all sorts of toil causing the use of the eye until late at night and sometimes with very defective light. To the second belong not only those things just enumerated, but also the construction and arrangement of school desks and benches, which, in many schools, make it next to impossible for pupils to hold their bodies in proper position for any length of time.

In order to demonstrate the role that bad air, bad light, &c., play in the school room, I extract some pertinent remarks from a paper published by Dr. Loring, of New York. He says: "I am, therefore, of the opinion that bad air alone, acting as the primal cause, may set in train a series of morbid processes which may, and often do, affect not only the *working capacity* and integrity of the organ, but which may lead even to its

total destruction. Thus simple irritation of the mucous membrane of the eye may, and often does, pass into actual inflammation, which, increasing in violence, may proceed from part to part till the entire organ is involved, and thus the sight become impaired or totally lost.

"Ought not the light to fall, not full in the face of the child, but first on the book or work and be reflected into the eye? Before answering this question precisely as it now stands, I should like to premise it by making the general assertion that not only is the direction in which the light comes important, but also its quantity and quality. Reduction in illumination is as a rule precisely equivalent to a reduction in the size of the object; therefore, the less the light the nearer an object must be brought to the eye, and the greater the strain in the act of vision. It is impossible to fix with any scientific exactness just the size that a window should be to give sufficient light for visual purposes, since this must vary with the exposure and surroundings of the room; but it has been reckoned in Germany that for a class room containing twenty persons there should be at least four to six thousand square inches of glass, which would give to each scholar from 200 to 300 square inches, or what would be represented by a pane of glass from 14 to 17 inches square. Such a room as this would be sufficiently lighted in any part. A room 20 feet square should not contain less than 70 to 80 square feet of glass, and it may be laid down as a rule that too much light cannot be obtained in a room, as all excess of glare can be guarded against by artificial shades if properly applied. More light enters the room from the same amount of glass from the south than from the north, and a southern, southeastern, or southwestern exposure is better than a northern, northeastern, or northwestern, especially for class rooms, and this, too, simply in regard to the amount of light and independent of the purifying influences of direct sunlight. That a north room is better for the purposes of the artist is due to other causes and does not affect the general rule. [But see the opinion of Dr. Jones, quoted on p. 18, note.]

"The light should not come from directly in front, and especially is this the rule when artificial light is used. For when the light comes from directly in front of the person, the pupil of the eye becomes unduly contracted, which is equivalent to reducing the quantity of light, since less light enters the eye from the object viewed, while the eye is exposed to too much light reflected from the surrounding objects, and from the direct rays from the source of illumination. Neither should the light come from directly behind, as the object then lies in the shadow of the body. Nor yet from the right side, because in writing the shadow of the hand falls across the page, and a moving shadow over a lighted surface not only reduces the quantity of light and leads to a stooping position, but it is also more annoying to the eye than a uniform reduction in the illumination of even a greater degree." The best direction for the light to come from is the left hand side, and

from rather above than below the level of the head. Windows, therefore, should not be run down too near to the floor, as they often are in class rooms and offices. I do not agree with the opinion often expressed, that the best light is that coming from directly above. I cannot refrain from adding, in this connection, the conclusion founded on Dr. Cohn's elaborate investigations in regard to nearsightedness among school children in Germany. He thus formulates it: "The narrower the street in which the school-house was built, the higher the opposite buildings, and the lower the story occupied by the class, the greater the number of nearsighted scholars." I should, then, from these considerations, say that the angle at which the light strikes the eye is important.¹

SIZE AND QUALITY OF TYPE TO BE PREFERRED.

Do the size and quality of the type cause disease of the eye? Young children should never hold the book nearer to the eye than ten inches and adults never farther from the eye than eighteen inches. As soon as perfectly distinct vision at this distance cannot be obtained, and if obtained cannot be easily maintained, recourse should be had to spectacles. The finer, then, the type the closer the book has to be brought to the eye, and the greater the tension or demand on the focalizing power and the muscles which are used in bringing both eyes to bear at the same time upon the object viewed. These two acts make what is called the act of accommodation of the eye, and tension of the accommodation, that is, long continued use of the eye upon objects brought close to it, is considered by all authorities one of the most (if not the most) fertile causes of progressive nearsightedness. This condition may be accompanied by morbid processes which may involve the deeper seated membranes of the eye to such a degree as not only to affect the vision but to destroy it. Too fine print, therefore, may be, I think, looked upon as a factor in producing eye disease, affecting not only the external but also the internal parts of the organ. On the other hand, too coarse print is wearisome to the eye, as it requires more exertion of the muscles governing the movements of the eye, that is, for a given amount of matter, and especially is this the case when the breadth of the page is, if anything, too great. This causes undue exertion on the part of the muscles which move the eye in a lateral direction and is apt to lead to confusion in finding the next succeeding line. It is for this reason that the narrow form of English blank verse is so little fatiguing to the eye. A double column page which is well printed and properly divided is cer-

¹ "The window by which we read, write, draw, sew, or do any other such work should look towards the north rather than towards other directions. And the desk or work-table should be so placed that the light from the window may fall obliquely from above, behind, and over the left shoulder, on the book, paper, or work. By this arrangement the light does not fall directly into our eyes, nor is it reflected directly back from the object into them."—(Defects of Sight and Hearing, by Dr. T. Wharton Jones.)

tainly preferable to the same amount of matter extending in a single line across the entire page.¹

The less contrast there is between an object and its surroundings, the more difficult it is to see the object and the closer it has to be brought to the eye. A faintly printed page has, therefore, to be brought nearer, oftentimes very much nearer, than a well printed page of the same type. There is nothing more wearisome to an eye than an indistinct and blurred image of a familiar object, and no more striking example of this could be found than blurred or faintly printed type. This should be sharply cut, and be what is technically called "heavy faced," in contradistinction to "light faced" type. Of the former a common example is the English; of the latter, the American. The ink is also a matter of importance. English ink, like the type, is vastly superior to ours. The color and quality of the paper have also an influence upon the ease with which the act of vision is performed; for, while it is true that there should be as much contrast as possible between the type and its surroundings, care should be taken to avoid all glare or dazzling of the page. Pure white paper, such as is ordinarily used in this country, should not be employed, most of all when it has, as it often has in the cheaper papers, a metallic lustre with a bluish tinge. I have come to the conclusion that, as a rule, a very light, almost imperceptible, yellow tinge is the best. This is known to the trade as "natural" tint, from the fact that it contains no dye whatever and has been bleached only to a moderate degree. It has the color of unbleached cotton cloth. It is, however expensive, as it can be made only from the best stock; still, a very good imitation can be had in some of the second class papers at a moderate cost. The paper should be thick enough not to be transparent, and should have a close, fine texture and be free from sponginess. From these facts, I am of the opinion that, both in respect to size and quality, imperfect type may be considered as a factor in the production of eye diseases.

NEED OF REST AND CARE FOR THE EYES.

Does too long and constrained attention to one object, without rest or variety, cause eye disease? That prolonged tension of the eyes may be the primal cause of a great number of diseases of the eye is admitted by all authorities, and the more fixed the gaze and the narrower the field

¹ The individual experience of each reader will be his most trustworthy guide as to the suitability of different sizes of print for his own use; any suggestions on this point, therefore, beyond the caution to heed the first intimations received that the strain to which the eyes are being subjected is too great, seem uncalled for. In order that the reader, however, may be able to determine whether he enjoys normal vision there has been added in the appendix a set of Snellen's test types, with the respective distances in feet at which each should be distinctly legible. Various schemes for determining visual power have been devised, but the test types of Professor Snellen, of Utrecht, here given, have long been in the most general use. At the London International Medical Congress of 1881 they were named as the proper tests for mariners and railway employés.— (Note by the Commissioner.)

of view the greater the danger. If it be true that continued tension of muscular and nervous force unduly exhausts the energy of any organ, it is doubly true of the eye. The nervous energy of the retina, sensitive and rapid as it is, is just as rapidly exhausted, and the act of reading would be unbearable after a few moments if the eye did not quickly change its position from letter to letter and from line to line. Diversity of action is as much a necessity in the case of the eye as of any other organ for an easy and lasting performance of its functions. No eye, in my opinion, should be used more than an hour at the furthest in the act of reading or writing without an interruption of the gaze, and it would be better if several, if not many, interruptions should take place in the same time. This usually happens in the case of adults, for some reason or other; but children, in order to complete their tasks in an allotted time, are often compelled to use their eyes, without sufficient interruption, by the hour together. It would be impossible, and out of keeping with the condensed character of these remarks, to enumerate here all the diseases which may arise from prolonged tension of the eyes on near work; but there is one affection produced by it which is so frequent in its occurrence and so unfortunate in its results that I cannot refrain from quoting the remarks of the distinguished Professor Donders. He says:

“The distribution of nearsightedness chiefly in the cultivated ranks points directly to its principal cause, viz, tension of the eyes for near objects. Respecting this fact there can be no doubt. Three factors may here come under observation: (1) Pressure of the muscles on the eyeball in strong convergence of the visual axes; (2) increased pressure of the fluids, resulting from accumulation of blood in the eye in stooping; (3) congestive processes in the eye, which, tending to softening, give rise to extension of the membranes. Now, in connection with the causes mentioned, the injurious effect of fine work is, by imperfect illumination, still more increased. To this it is to be ascribed that in schools where, by bad light, the pupils read bad print or write with pale ink, the foundation of nearsightedness is mainly laid, which, in fact, is usually developed in these years.”

But little will be said in reference to desks and seats, though it would seem they deserve the most careful consideration on the part of those in charge of the education of children, since a large portion of a child's life is spent behind the one and upon the other. It has been contended that every pupil should have a desk to suit his size, but that in many instances is impracticable for several reasons, but mainly on account of the expense. The chief idea to be borne in mind in the arrangement of desks is that they should be so constructed that the children can sit without becoming too rapidly wearied and that the desks should not be so low as to cause the body to bend forward nor so high as to make studying difficult, as in writing, for instance. But of what use are all these proper arrangements at school, if, as soon as the children get to their own homes, *they* write and study at tables that are inconvenient even for the grown

members of the family? Of what benefit is the most superb illumination in the school room if the children, when at home, work several hours of the day in the corner of a badly-lighted chamber, and at night by the light of a flickering candle or lamp, used perhaps by five or six others of the family, and which is insufficient to properly light up the book or map of even one or two of these children? If we wish to protect the eyes of children during the time in which they are acquiring their education, give them, above all things else, plenty of well regulated light. They should be prohibited from using their books during twilight, by the light of the moon, and certainly should they be forbidden such dangerous use of their eyes as reading in bed. Says a well known writer: "It seems to me that the very etymology of the word education enforces the idea that the child is to grow better and stronger up through his school life; that by proper regulation of his diet and management at home, by properly lighted school-rooms and properly constructed desks, and by a better regulation of his hours of study, he should represent a much higher type of life when he has reached the age of twenty-five than when he is just taken in hand with the view of giving him book knowledge. We certainly should not damage the eye in the process of education, and I believe that the damage done to the eye is to be taken as an index of that which is done to the other organs of the body." In conclusion, when every school-house in the land and every school room and every school desk shall have been properly constructed according to the most scientific investigations, and plenty of good light thrown upon books properly and plainly printed with good ink; when the habits of study of all children shall have been regulated, both in the school room and at home, then do I feel convinced that, while we may not be able to banish these particular eye diseases from the world, without doubt will we be able to reduce them in number and in severity.



APPENDIX.

DR. SNELLEN'S TEST TYPES.

In order that readers may ascertain whether they have normal vision, a list of Professor Snellen's test types is subjoined. The figures over the letters indicate the number of feet at which the letters should be distinctly legible. Variations from normal vision may be recorded by using the numerals given as denominators and the distance in feet at which the letters are clearly seen as numerators; thus, if letters which should be legible at twenty feet can only be clearly perceived at ten feet, vision = $\frac{10}{20}$.

1 ft. 8½ in.

DSLAOMTEU

2 ft. 6 in.

ULHOEDTSFG

3 ft. 3½ in.

FOEHSUTDL

4 ft. 6 in.

ECLSTUFDCH

6 ft. 1½ in.

SLFDCEUHTO

7 ft.

DFSEOLUHCT

9 ft.

TCHDFSEULO



10 ft. $1\frac{1}{2}$ in.

ECHDLUTOPS

14 ft.

FOLUEDSTCH

15 ft. $2\frac{1}{2}$ in.

LSEOFDTHUC



21 ft.
U F D T C L S E O H

32 ft. 1 in.
C H O F D T

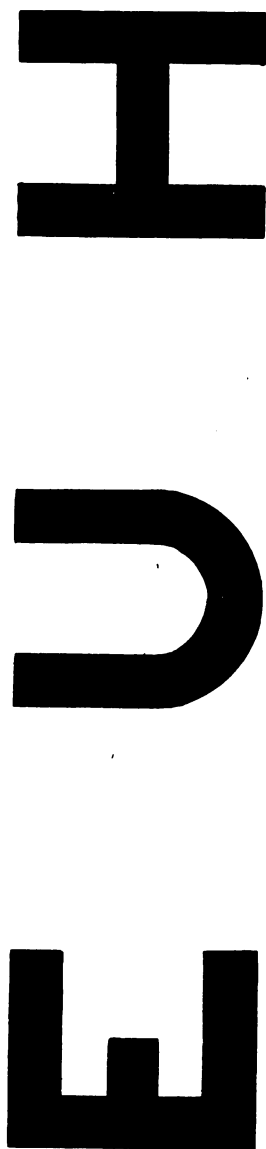
42 ft. 8½ in.
D F S E U



52 ft. 6 in.



73 ft.

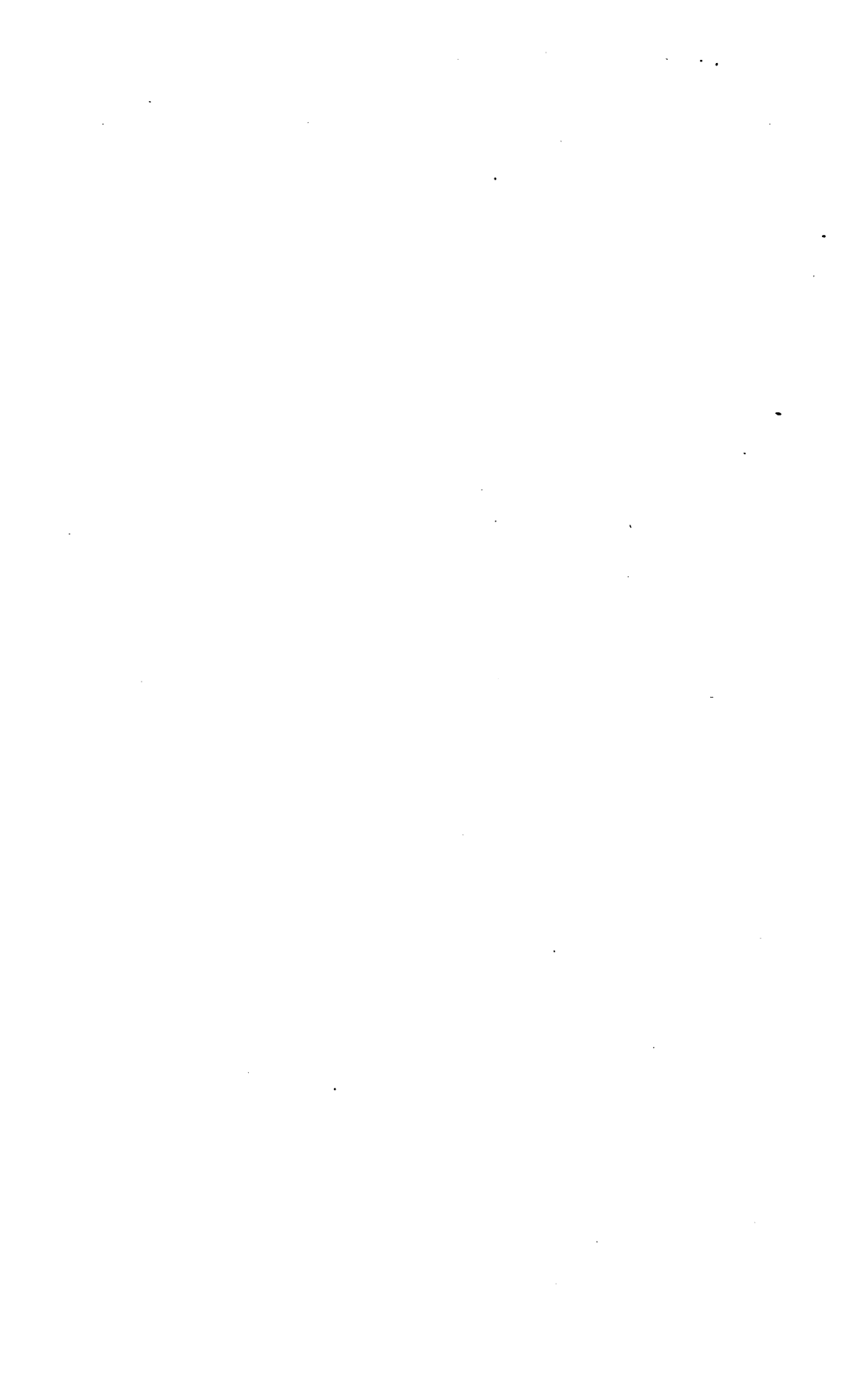






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